



Repair Manual

Jetta 2011 ➤
Jetta 2015 ➤

4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI
Engine, EA 888 Generation III)

Engine ID	CPLA	CPP A	CPK A	CPR A					
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Edition 05.2021



List of Workshop Manual Repair Groups

Repair Group

- 00 - General, Technical Data
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- 19 - Cooling System
- 21 - Turbocharger, Supercharger
- 24 - Multiport Fuel Injection
- 26 - Exhaust System, Emission Controls
- 28 - Ignition/Glow Plug System

Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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Jetta 2011 ►, Jetta 2015 ►

4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021



00 – General, Technical Data

1 Safety Precautions

(Edition 05.2021)

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⇒ [P1.1 recautions when Working on Fuel Supply System”, page 1](#)

⇒ [P1.2 recautions when Working on Start/Stop System”, page 2](#)

⇒ [P1.3 recautions during Road Test with Testing Equipment”, page 2](#)

⇒ [P1.4 recautions when Working on Cooling System”, page 2](#)

⇒ [P1.5 recautions when Working on Ignition System”, page 2](#)

1.1 Safety Precautions when Working on Fuel Supply System

WARNING

There is a Risk of Injury Due to the Fuel Being Under Pressure.

The fuel system is under pressure. Injuries are possible from fuel spraying out.

Before opening the fuel system:

- Wear protective eyewear.
- Wear safety gloves.
- Reduce the pressure: place clean cloths around the connection point and carefully open the connection point.

WARNING

Risk of a Fire Due to Leaking Fuel.

When the battery is connected, the door contact switch activates the fuel pump when opening the driver door. Leaking fuel can ignite and start a fire.

- Before opening the fuel system, interrupt the power supply to the fuel pump.

WARNING

Any type of fuel leak will result in an increased risk of fire.

Do not turn on the ignition, open the front doors, or attempt to start the engine at any time while any part of the vehicle's fuel system is unassembled. Failing to heed this warning could result in fire and personal injury



1.2 Safety Precautions when Working on Start/Stop System

WARNING

There Is a Risk of Injury Due to the Engine Starting Unexpectedly.

The engine can start unexpectedly on vehicles with an activated Start/Stop System. A message in the instrument cluster indicates whether the Start/Stop System is activated.

- Deactivating the Start/Stop System: Switch off the ignition.

1.3 Safety Precautions during Road Test with Testing Equipment

WARNING

There Is a Risk of Injury Caused by Unsecured Testing Equipment.

If the front passenger airbag deploys during an accident, unsecured testing equipment becomes a dangerous projectile.

- Secure the testing equipment to the rear seat.
or
- Have a second person operate the testing equipment on the rear seat.

1.4 Safety Precautions when Working on Cooling System

WARNING

Risk of Scalding Due to Hot Coolant

The cooling system is under pressure when the engine is warm. Risk of scalding due to hot steam and hot coolant.

- Wear safety gloves.
- Wear protective eyewear.
- Reduce the pressure by covering the coolant reservoir cap with a cloth and carefully opening it.

1.5 Safety Precautions when Working on Ignition System

DANGER

Risk of Injury Due to Electrocution

When the engine is running the ignition system is under high voltage. It is possible to be electrocuted by touching the ignition system.

- Never touch or remove the ignition wires when the engine is running or at starting speed.

**⚠ CAUTION**

Risk of Damaging the Components.

Washing the engine as well as connecting and disconnecting electrical wires when the engine is running can damage components.

- Switch off the ignition before connecting and disconnecting electrical wires.
- Switch off the ignition before washing the engine.



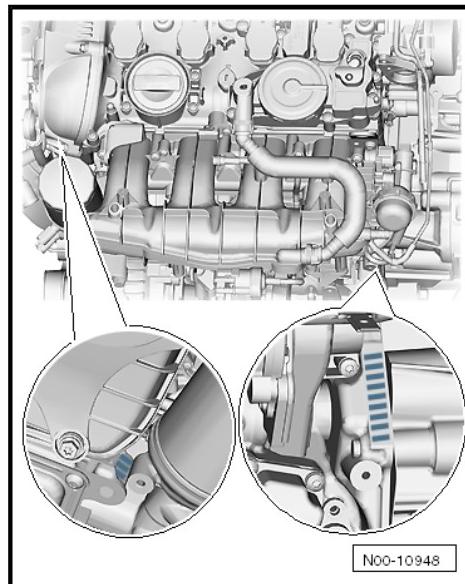
2 Identification

⇒ [N2.1 Number/Engine Specifications](#), page 4

2.1 Engine Number/Engine Specifications

Engine Number

The engine number ("engine codes" and "serial number") are located on the engine/transmission joint.



The engine code is also stamped on the cylinder block behind the oil filter.

There is also a sticker glued to the timing chain cover with the "engine code" and "serial number".

The first three digits describe the mechanical structure of the engine and are stamped on the engine. The fourth letter describes the engine torque and output and depends on the engine control module. The four-digit engine code is located on the type label and the vehicle data label. It can also be read via the engine control module.



Note

Vehicle data label locations. Refer to ⇒ Maintenance; Booklet 20.2.

Codes	CPRA	CPKA
Manufactured from	06/2013	06/2013
Emissions values	PZEV SULEV	BIN 5 TIER 2
Displacement liters	1.8	1.8
Output kW at RPM	125 at 4800 to 6200	125 at 4800 to 6200
Torque Nm at RPM	250 at 1500 to 4750	250 at 1500 to 4750
Bore Diameter in mm	82.5	82.5
Stroke mm	84.1	84.1
Compression ratio	9.6:1	9.6:1



Codes	CPRA	CPKA
Research Octane Number (RON)	minimum 95 unleaded (in exceptional cases, minimum 91 RON, but with reduced performance) TFSI / SIMOS 12 1-3-4-2 Turbocharger yes (Intake) yes	95 unleaded (in exceptional cases, minimum 91 RON, but with reduced performance) TFSI / SIMOS 12 1-3-4-2 Turbocharger yes (Intake) no
Injection system/ignition system	TFSI / SIMOS 12	TFSI / SIMOS 12
Ignition sequence	1-3-4-2	1-3-4-2
Turbocharger, Supercharger	Turbocharger	Turbocharger
Variable valve timing	yes (Intake)	yes (Intake)
Secondary air injection (AIR)	yes	no
Valves per cylinder	4	4
Oil Pressure Control	yes	yes

Codes	CPLA	CPLA	CPLA	CPLA	CPPA
Manufactured from	02/2013	02/2013	02/2013	02/2013	02/2013
Emissions values	BIN 5 TIER 2	EU 2	EU 5 Plus	Tier 2 BR	SULEV
Displacement liters	2.0	2.0	2.0	2.0	2.0
Output kW at RPM	155 at 5300 to 6200	155 at 5300 to 6200	155 at 5300 to 6200	155 at 5300 to 6200	155 at 5300 to 6200
Torque Nm at RPM	280 at 1700 to 5200	280 at 1700 to 5200	280 at 1700 to 5200	280 at 1700 to 5200	280 at 1700 to 5200
Bore Diameter in mm	82.5	82.5	82.5	82.5	82.5
Stroke mm	92.8	92.8	92.8	92.8	92.8
Compression ratio	9.6:1	9.6:1	9.6:1	9.6:1	9.6:1
Research Octane Number (RON)	minimum 95 unleaded (in exceptional cases, minimum 91 RON, but with reduced performance)	95 unleaded (in exceptional cases, minimum 91 RON, but with reduced performance)	95 unleaded (in exceptional cases, minimum 91 RON, but with reduced performance)	95 unleaded (in exceptional cases, minimum 91 RON, but with reduced performance)	95 unleaded (in exceptional cases, minimum 91 RON, but with reduced performance)
Injection system/ignition system	TFSI / SI-MOS 12 1-3-4-2	TFSI / SI-MOS 12 1-3-4-2	TFSI / SI-MOS 12 1-3-4-2	TFSI / SI-MOS 12 1-3-4-2	TFSI / SI-MOS 12 1-3-4-2
Ignition sequence					
Turbocharger, Supercharger	Turbocharger	Turbocharger	Turbocharger	Turbocharger	Turbocharger
Variable valve timing	yes (Intake)	yes (Intake)	yes (Intake)	yes (Intake)	yes (Intake)
Secondary air injection (AIR)	no	no	no	no	yes
Valves per cylinder	4	4	4	4	4
Oil pressure control	yes	yes	yes	yes	yes



3 Repair Information

[⇒ f3.1 or Clean Working Conditions", page 6](#)

[⇒ I3.2 Information", page 6](#)

[⇒ R3.3 Repair Information", page 7](#)

[⇒ S3.4 System, Checking", page 7](#)

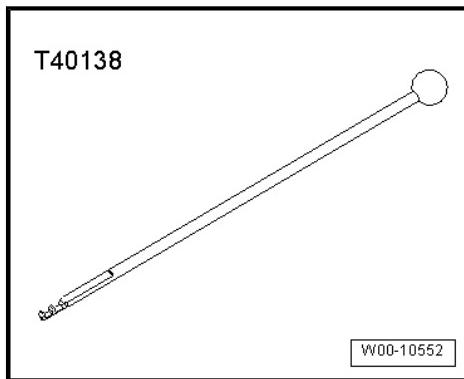
3.1 Guidelines for Clean Working Conditions

When working on the fuel supply/injection system, pay careful attention to the following "5 rules" of cleanliness:

- ◆ Thoroughly clean the connection points and the surrounding area before loosening.
- ◆ Place the removed parts on a clean surface and cover them. Only use lint-free cloths.
- ◆ Carefully cover or seal opened components if the repair is not performed immediately.
- ◆ Install only clean parts: remove the replacement parts from their packaging just before installing them. Do not use parts that have been loosely stored or unpackaged (for example, in tool boxes etc.).
- ◆ Do not work with compressed air when the system is open. Do not move the vehicle.
- ◆ Make sure no fuel gets onto the fuel hoses. If necessary, the fuel hoses must be cleaned again immediately.
- ◆ Protect any disconnected connectors from dirt and moisture, and only connect them when they are completely dry.

3.2 General Information

- ◆ The engine control module is equipped with OBD. The DTC memory must be checked before repairing. Check the vacuum hoses and connections for air leaks.
- ◆ Fuel hoses in the engine compartment may only be secured with spring clamps. The use of clamps or screw-type clamps is not permitted.
- ◆ For the electric components to function correctly, a voltage of at least 11.5 volts is required.
- ◆ Do not use sealants containing silicone. Particles of silicone components that are drawn into the engine are not burned there, and they damage the heated oxygen sensors.
- ◆ The vehicles have an emergency fuel shut-off. This reduces the risk of vehicle fire after a crash. The fuel pump relay switches off the fuel pump.
- ◆ At the same time this setup also makes it easier to start the engine. Every time the driver door is opened, the fuel pump is activated for two seconds. The initial fuel pressure then rises. Follow all safety precautions.
- ◆ If it is difficult to disconnect the connectors, use a -T40138-.



3.3 General Repair Information

- ◆ Clean the work area and tools before working on the injection system.
- ◆ If the high pressure lines are not going to be replaced, they must be marked when being removed. The high pressure lines may only be installed again on the same cylinder.
- ◆ Align the high pressure lines without tension. First tighten all connections hand-tight and then tighten them again to the tightening specification.
- ◆ Never bend the high pressure lines.
- ◆ It is permitted to use tools only for tightening and loosening the lines on the entire high pressure system. All other installation or removal procedures must be performed by hand without using any tools.
- ◆ All cable ties that are loosened or cut open during removal must be replaced in the same position during installation.
- ◆ Fuel hoses in the engine compartment may only be secured with spring clamps. The use of clamps or screw-type clamps is not permitted.

3.4 Vacuum System, Checking

Special tools and workshop equipment required

- ◆ Hand Vacuum Pump -VAS6213-

Procedure

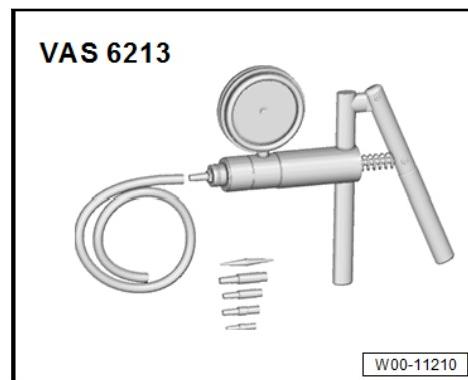
- Check all vacuum lines in the vacuum system for:
 - ◆ Cracks
 - ◆ Damage caused by animals
 - ◆ Pinching
 - ◆ Porous locations and other leaks
- Check the vacuum line leading both to and from the solenoid valve to the respective component.
- If there is a DTC memory entry, check all the vacuum lines for the named component, but also all the remaining vacuum lines to the other components.
- If using the -VAS6213- does not produce any pressure or if the pressure drops again right away, then check the hand vacuum pump and the connection hoses for leaks.
- If using the -VAS6213- does not produce any pressure or if the pressure drops again right away, then check the hand vacuum pump and the connection hoses for leaks.



4 Special Tools

Special tools and workshop equipment required

- ◆ Hand Vacuum Pump -VAS6213-





10 – Engine Assembly

1 Engine, Removing and Installing

[⇒ R1.1 emoving", page 9](#)

[⇒ a1.2 nd Transmission, Separating", page 19](#)

[⇒ S1.3 ecuring to Engine and Transmission Holder", page 20](#)

[⇒ I1.4 nstalling", page 22](#)

1.1 Engine, Removing

Special tools and workshop equipment required

- ◆ Engine and Gearbox Jack -VAS6931-
- ◆ Engine Bung Set -VAS6122-
- ◆ Shop Crane - Drip Tray -VAS6208-
- ◆ Hose Clip Pliers -VAS6362-
- ◆ Locking Pin -T10060A-
- ◆ Engine Support -T10497- with Pins -T10497/1-
- ◆ Engine Support - Clamp -T10497/4-
- ◆ Securing element from the Transmission Support -3282-
- ◆ Pry Lever -80-200-
- ◆ Protective Mat -VAS531003-
- ◆ Commercially Available Step Ladder
- ◆ Protective Eyewear
- ◆ Safety Gloves

Procedure



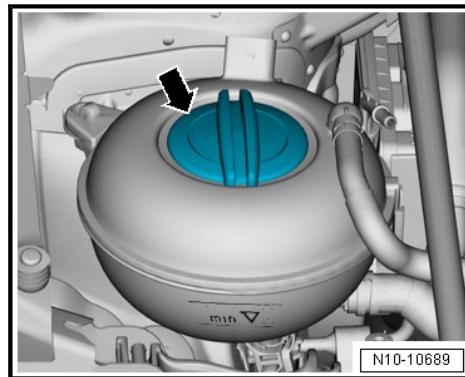
Caution

The cooling system is under pressure when the engine is warm. Risk of scalding due to hot steam and hot coolant.

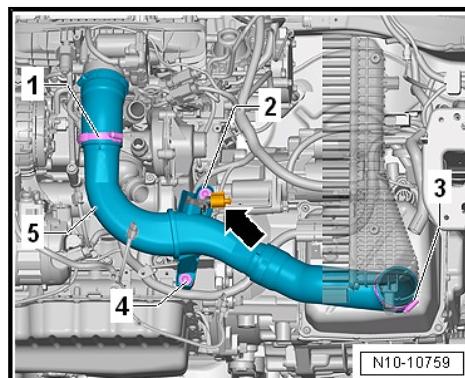
Scalding the skin and other parts of the body is possible.

- *Wear safety gloves.*
- *Wear protective eyewear.*
- *Reduce the pressure by covering the coolant expansion tank cap with a cloth and carefully opening it.*

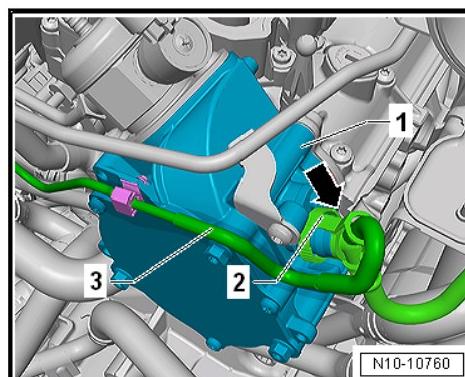
- Remove the coolant expansion tank cap -arrow-.



- Remove the engine cover. Refer to [⇒ C3.1 over, Removing and Installing](#), page 40 .
- Drain the coolant. Refer to [⇒ D1.3 raining and Filling](#), page 239 .
- Remove the air filter housing. Refer to [⇒ F3.2 ilter Housing, Removing and Installing](#), page 329 .
- Remove the battery tray. Refer to [⇒ Electrical Equipment; Rep. Gr. 27; Battery; Battery Tray, Removing and Installing](#).
- Remove the radiator. Refer to [⇒ R4.4 emoving and Instal-](#)
[ling](#), page 272 .
- To prevent damage, cover the charge air cooler using suitable service equipment.
- Loosen the hose clamps -1 and 3-.

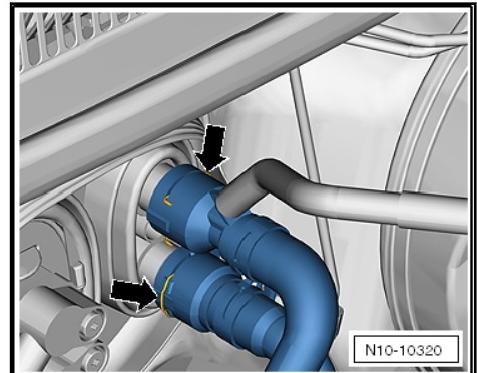


- Disconnect the connector from the Charge Air Pressure Sensor -G31- -arrow-.
- Remove the bolts -2 and 4- and remove the air duct pipe -5- downward.
- Remove the vacuum hose -3- from the connection -arrow-.





- Press the vacuum hose release buttons -2- and remove from the vacuum pump -1-.
- Lift the clips -arrows- and remove the coolant hoses from the heater core for the heater.

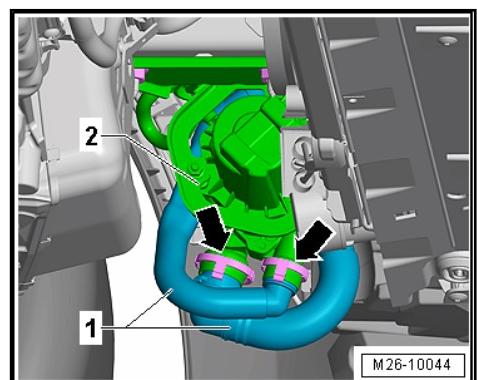


Note

There may be a heat shield installed that does not need to be removed.

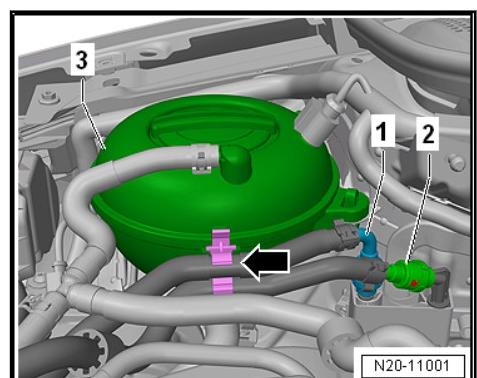
- Hold the coolant hoses downward and allow the coolant to drain.
- Remove the left and right front wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Overview - Front Wheel Housing Liner.

Vehicles with Secondary Air System



- Press the release -arrows- and remove the lines -1- from the Secondary Air Injection Pump Motor -V101- -2-.

Continuation for All Vehicles

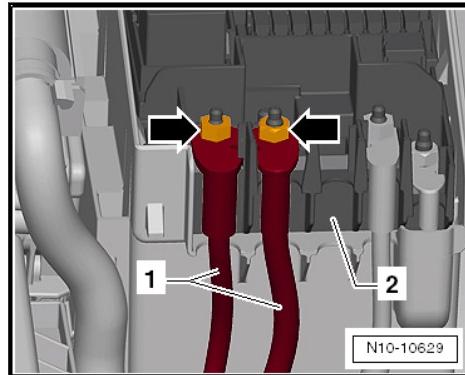




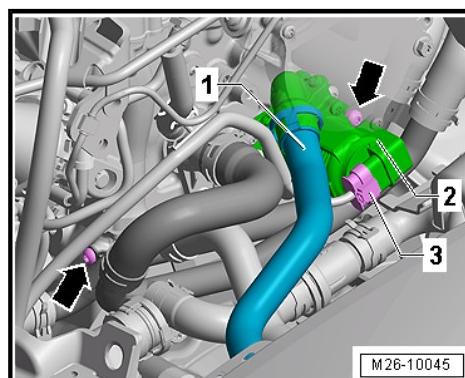
Jetta 2011 >, Jetta 2015 >

4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

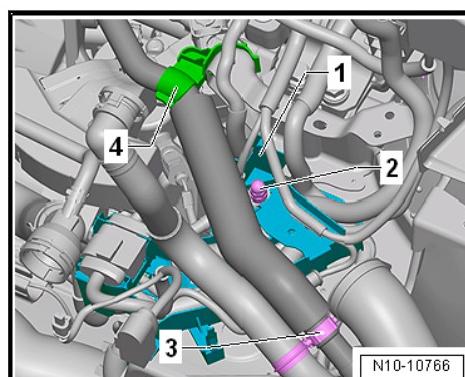
- Remove the catalytic converter. Refer to [⇒ C2.2 onverter, Removing and Installing](#), page 374 .
- Unclip the hoses from the bracket -arrow- of the expansion tank -3-.
- Disconnect the hose couplings -1 and 2-. Refer to ⇒ Rep. Gr. 20; Couplings; Couplings, Disconnecting
- Loosen the nuts -arrows- to disconnect the battery positive cables -1- from the E-box -2-.



Vehicles with Secondary Air System



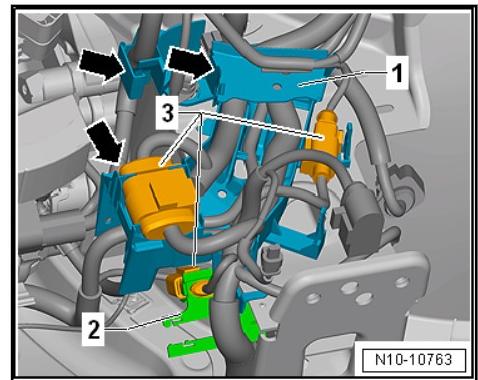
- Squeeze the locking ring on both sides to remove the connecting pipe -1-.
- Carefully unclip the secondary air line bracket -4-.



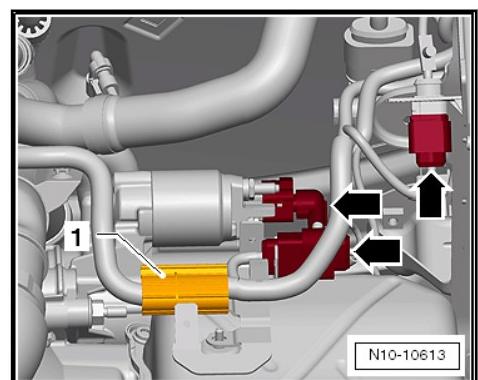
- Unclip the clip -3- and remove both secondary air lines.



Continuation for All Vehicles



- Remove the ground connection -2- and free up the cable guide -1-.
- Release and disconnect the connectors -3-.
- Open the locking mechanisms -arrows- for the cable guide -1- and place the wiring harness on the engine.
- Disconnect and remove the connectors -arrow-.



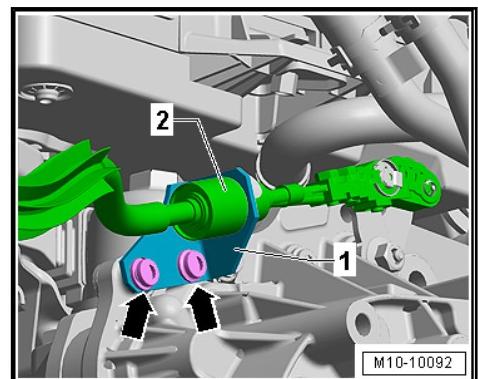
- Unclip the wiring harness from the bracket -1-.



Note

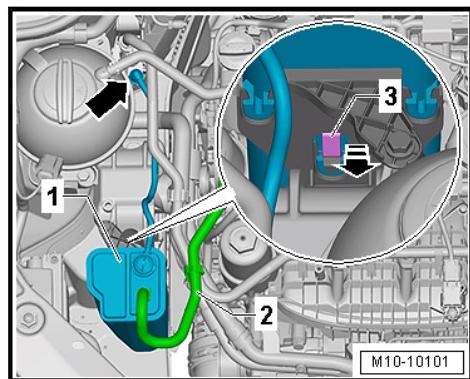
Do not bend or kink the selector lever cable.

- Remove the selector lever cable from the transmission.
- Remove the bolts -arrows- and set the selector lever cable -2- with the cable bracket -1- aside.



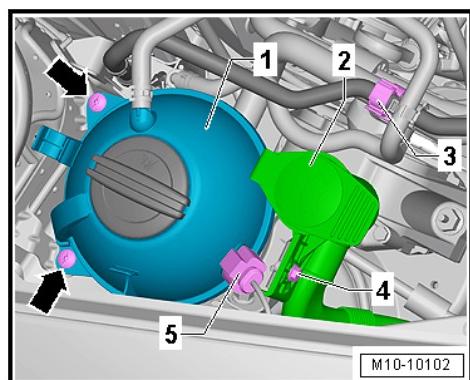


EVAP Canister in Engine Compartment

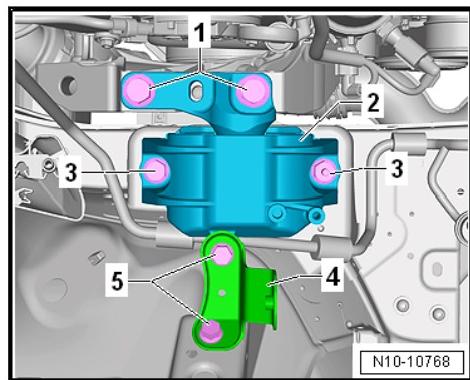


- Remove the breather line -arrow-. Refer to ⇒ Rep. Gr. 20; Couplings; Couplings, Disconnecting.
- Release the tab -3- in the direction of the -arrow- and remove the EVAP canister -1- upward.
- Lay the EVAP canister -1- on the engine with the line attached -2-.

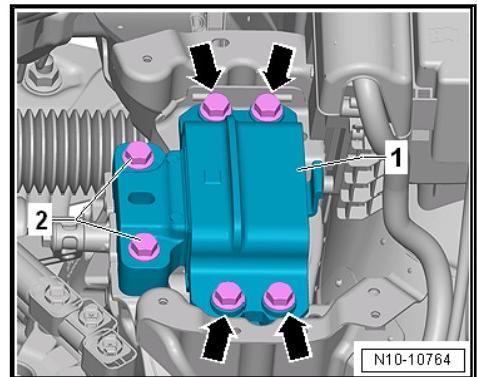
Continuation for All Vehicles



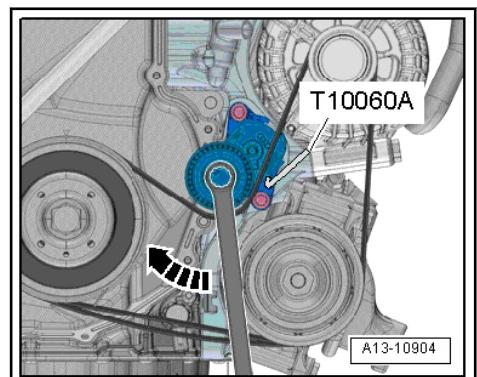
- Remove the bolt -4- and rotate the washer fluid reservoir filler tube -2- forward.
- Open the clip -3- and remove the connector -5- from the coolant expansion tank -1-.
- Remove the bolts -arrows- and place the coolant expansion tank -1- on the engine with the hoses connected.
- Loosen the bolts -1- for the engine mount -2- approximately two turns.



- Loosen the bolts -2- on the transmission mount -1- two turns.



- Before removing the ribbed belt, mark the running direction with chalk or a felt-tip pen for reinstallation.



- Move the tensioner in the direction of -arrow- to release the tension on the ribbed belt.
- Remove the ribbed belt from the A/C compressor ribbed belt pulley and release the tension on the tensioner. If necessary, remove the -T10060A-.

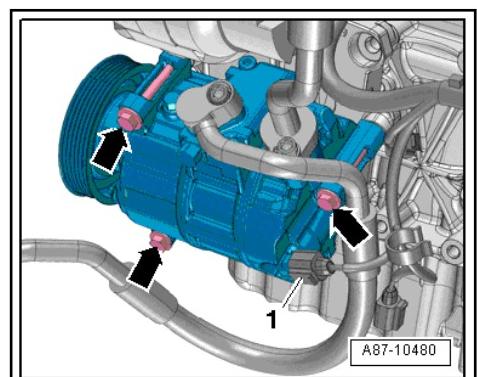


Caution

Danger of frostbite from refrigerant.

- *Do not open the A/C system refrigerant circuit.*

- Disconnect the connector -1- from the A/C Compressor Regulator Valve -N280-.

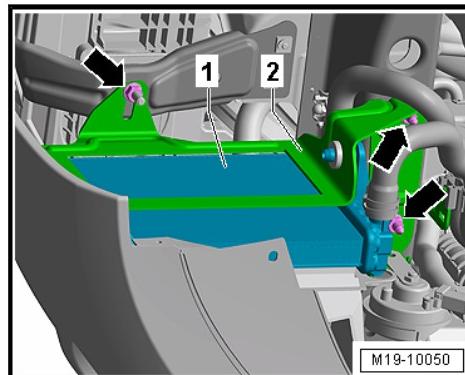


- Remove the bolts -arrows-.
- Remove the A/C compressor from the bracket with the refrigerant hoses attached.



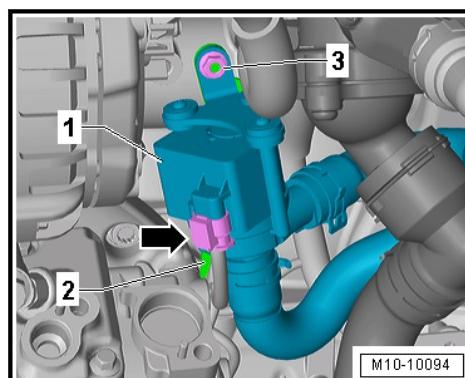
- Remove the left and right drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40; Drive Axle; Drive Axle, Removing and Installing.

Vehicles with Coolant Auxiliary Cooler

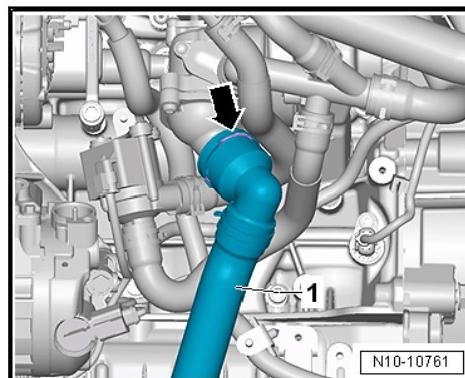


- Remove the nuts -arrows- from the coolant auxiliary cooler bracket -2-.
- Unclip the air duct on the coolant auxiliary cooler.
- Remove the coolant auxiliary cooler -1- with the bracket -2- and attached coolant hoses and secure to engine.

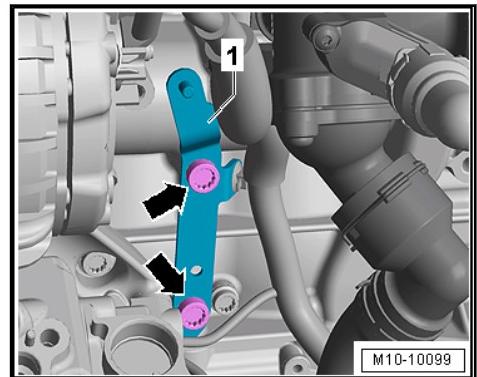
Continuation for All Vehicles



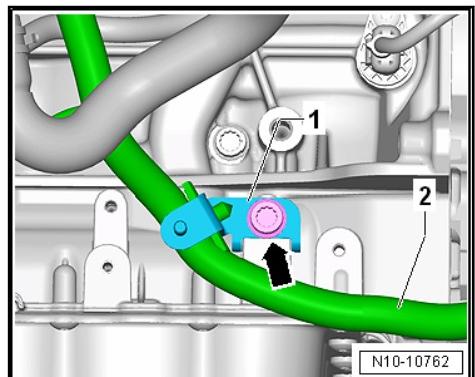
- Remove the connector -arrow- from the After-Run Coolant Pump -V51- -1-.
- Remove the nut -3- and remove the After-Run Coolant Pump -V51- -1- from the bracket -2-.
- Press the release -arrow- and remove the coolant hose -1- from the controller housing.



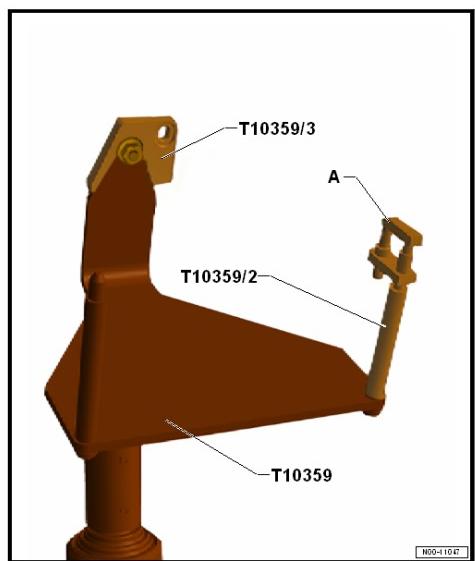
- Remove the bolts -arrows- and move the bracket to the side.



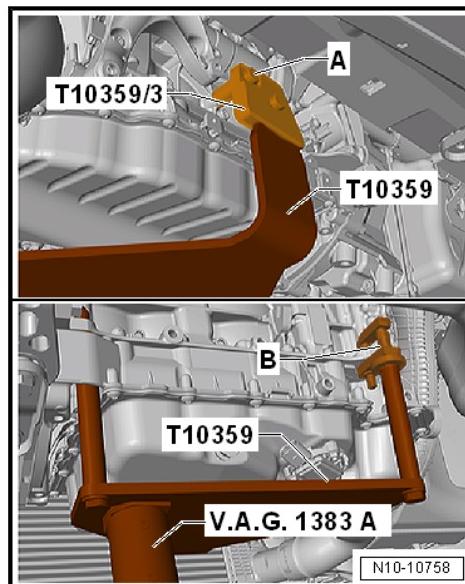
- Remove the bolt -arrow- for the bracket -1-.



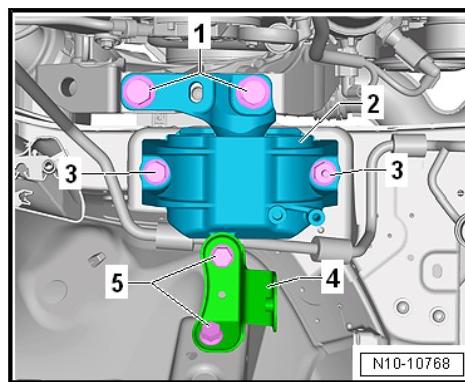
- Lightly push the wire -2- upward.
- Position the -T10359/3- on the -T10359A- from above and secure it.



- Tighten the -T10359/2- onto the engine bracket with the securing element -A- from the -3282-.
- Position the -T10359A- on the -VAS6931- and bring it into position with the engine/transmission assembly.
- After the -T10359A- is positioned correctly, install the bolt -A- with the spacer sleeve on the -T10359A-.
- Secure the engine bracket on the engine using the securing element -B- from the -3282- and slightly lift the engine/transmission assembly.



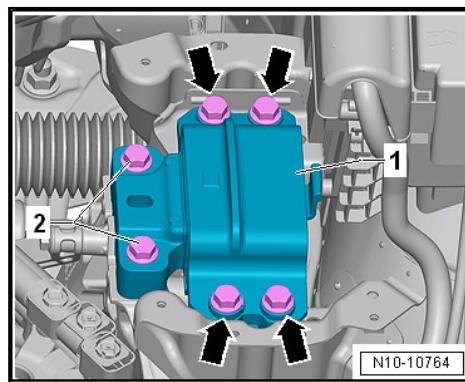
- Completely remove the bolts -1- for the engine mount -2-.



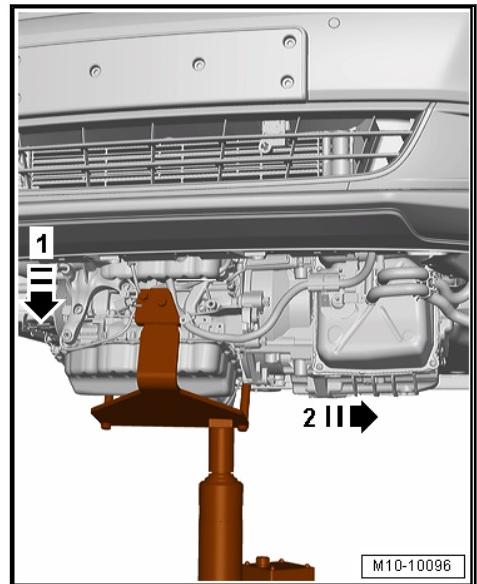
Note

Depending on the transmission there can be two or three bolts installed.

- Remove the bolts -2- completely.



- Carefully lower the engine/transmission assembly in the direction of -arrow 1-.



- Carefully guide the engine/transmission assembly forward and out to the left in the direction of -arrow 2-.

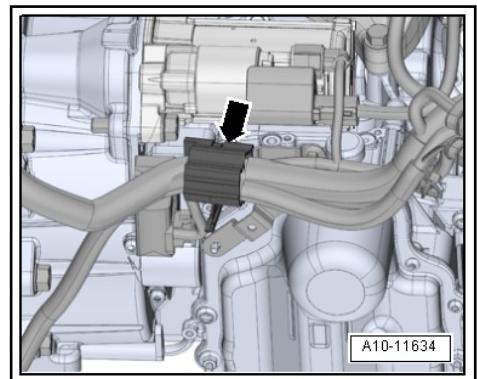
1.2 Engine and Transmission, Separating

Special tools and workshop equipment required

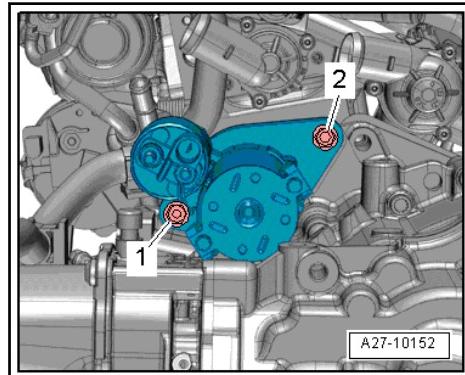
- ◆ Engine/Gearbox Support Shackle (2 pc.) -10-222A/12-
- ◆ Shop Crane -VAS6100-

Procedure

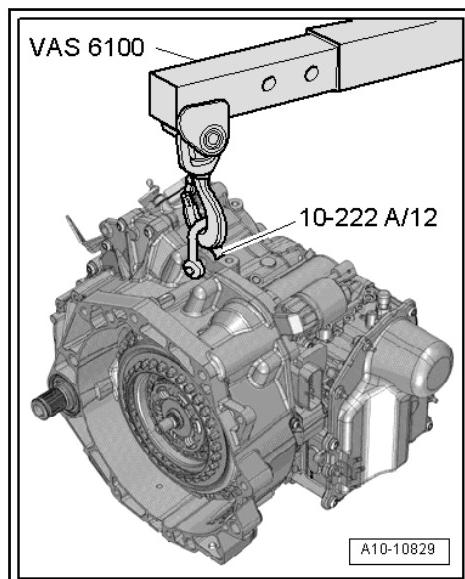
- Engine/transmission assembly removed and mounted on -T10359A-.
- Free up the electrical wires at the bracket -arrow-.



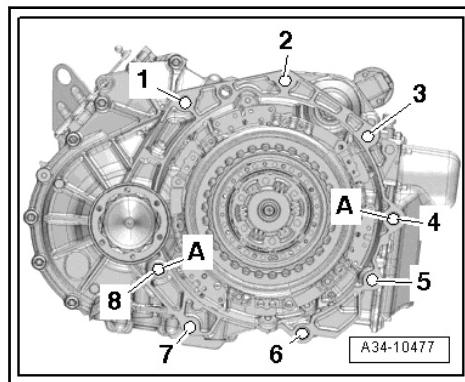
- Remove the bolts -1 and 2- and then remove the starter from the transmission.



- Secure the transmission on the -VAS6100- using the -10-222A/12-.



- Remove the bolts -1, 3, 4, 5, 6, 7 and 8- that connect the transmission to the engine.
- Remove the transmission from the engine.



1.3 Engine, Securing to Engine and Transmission Holder

Special tools and workshop equipment required

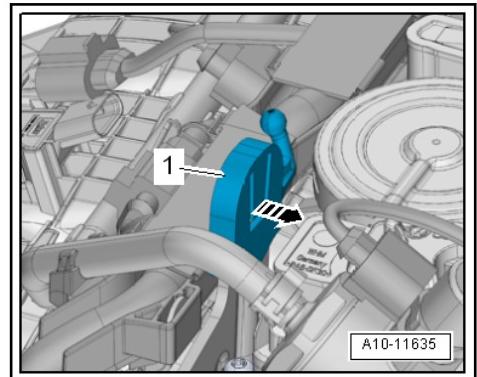
- ◆ Engine Sling -2024A-
- ◆ Shop Crane -VAS6100-



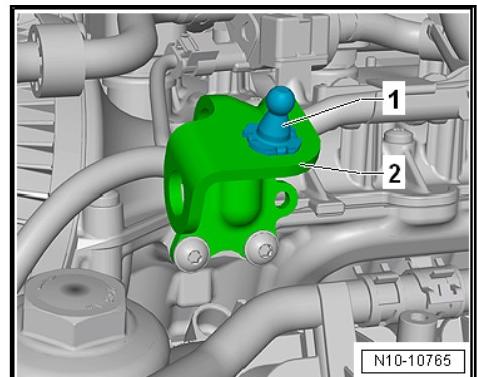
◆ Engine and Gearbox Bracket -VAS6095A-

Procedure

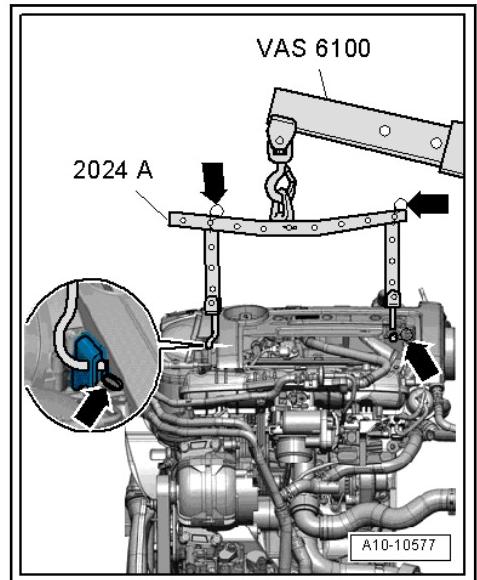
- The transmission is separated from the engine. Refer to [a1.2 nd Transmission, Separating", page 19](#).
- Release the retainer in direction of -arrow- and remove the engine cover mount -1-.



- Unclip the mount -1- for the right engine cover -2- from the hole.



- Engage the -2024A- onto the engine and onto the - VAS6100-.

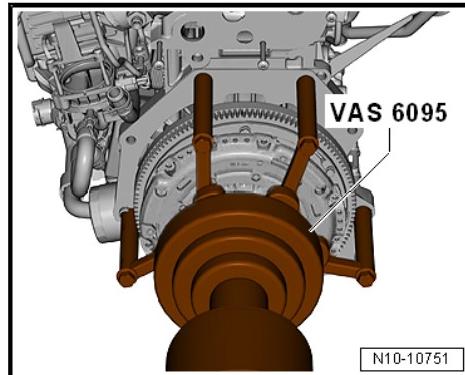




Note

To be aligned to the center of gravity of the engine assembly, the rail with holes for the lifting hook must be inserted as shown in the illustration.

- Lower the engine from the -VAS6931- using the -VAS6100-.
- Secure the transmission side of the engine to the -VAS6095A- as illustrated.



1.4 Engine, Installing

Tightening Specifications

Note

- ◆ *The tightening specifications only apply to lightly greased, oiled, phosphated or blackened nuts and bolts.*
- ◆ *Additional lubricants, such as engine or transmission oil are permissible, although lubricants containing graphite are not.*
- ◆ *Do not use any ungreased parts.*
- ◆ *Tightening specification tolerance: ±15%.*

Component	Nm	
Bolts and nuts	M 6	10
	M 7	15
	M 8	20
	M 10	40
	M 12	65

- ◆ Refer to [⇒ -2.1 Subframe Mount](#), page 26 .
- ◆ Refer to ⇒ Rep. Gr. 34; Transmission, Removing and Installing; Transmission Tightening Specifications.



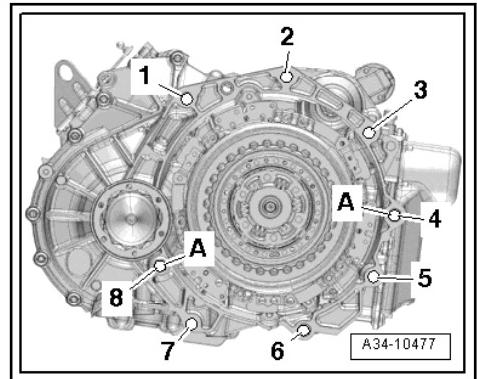
Procedure



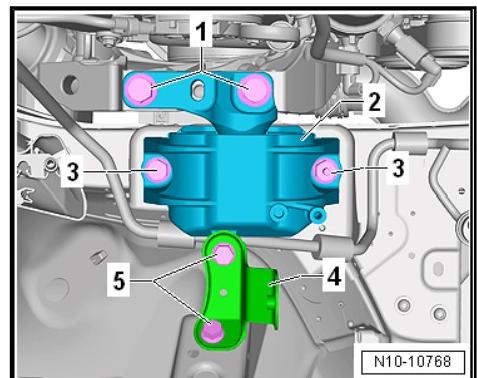
Note

- ◆ Replace the bolts that were tightened with an additional turn.
- ◆ Replace the self-locking nuts and bolts, gaskets, seals and O-rings.
- ◆ The hose connections as well as air duct pipes and hoses must be free of oil and grease before installing.
- ◆ Secure all hose connections with hose clamps that match the ones used in series production. Refer to the Parts Catalog.
- ◆ During installation, all cable ties must be installed at the same location.

- Install the intermediate plate. Refer to [⇒ Fig. ““Intermediate Plate, Installing””, page 66](#).
- If the alignment sleeves -A- for centering the engine and transmission are missing inside the cylinder block, then install the sleeves.

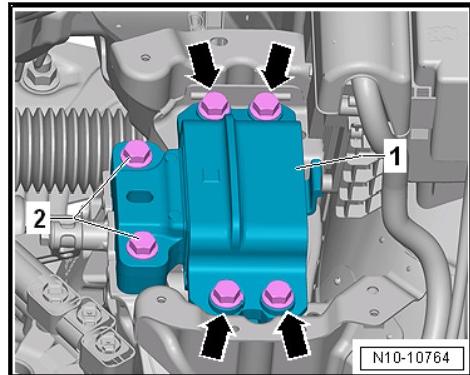


- If no needle bearing is installed in the crankshaft, install the needle bearing. Refer to [⇒ N3.4 eedle Bearing, Replacing”, page 83](#).
- Attach the transmission to the engine.
- Install the starter. Refer to [⇒ Electrical Equipment; Rep. Gr. 27; Starter; Starter, Removing and Installing](#).
- Guide the engine/transmission assembly into the body.
- First install the bolts -1- for the engine mount all the way by hand.





- Then install the bolts -2- for the transmission mount all the way by hand.



Note

- ◆ Only tighten the bolts to the final specification when installing the subframe mount. Refer to [⇒ -2.1 Subframe Mount](#), page 26 .
 - ◆ Depending on the transmission there can be two or three bolts installed.
- Remove the -T10359A- from the engine.
 - Install the drive axles. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40; Drive Axle; Overview - Drive Axle.
 - Install the A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor; Overview - A/C Compressor Power Unit.
 - Install the ribbed belt. Refer to [⇒ B1.2 elt, Removing and Installing](#), page 49 .
 - Adjust the subframe mount. Refer to [⇒ M2.6 ount, Adjusting](#), page 37 .
 - Install the battery tray. Refer to ⇒ Electrical Equipment; Rep. Gr. 27; Battery; Overview - Battery.
 - Electrical connections and routing. Refer to ⇒ Electrical Equipment; Rep. Gr. 97; Control Modules; Component Location Overview - Control Modules and ⇒ Wiring diagrams, Troubleshooting & Component locations.
 - Re-install the secondary air lines and connect them with the Secondary Air Injection Pump Motor -V101- and the Secondary Air Injection Solenoid Valve -N112-. Refer to [⇒ A3 ir System](#), page 379 .
 - Install the air filter housing. Refer to [⇒ F3.2 ilter Housing, Removing and Installing](#), page 329 .
 - Check the oil level. Refer to ⇒ Maintenance; Booklet 20.2; Procedure Descriptions; Engine Oil Level, Checking.
 - Attach the coolant hoses with a connector coupling to the heater core for the heater.
 - Fill with coolant. Refer to [⇒ page 242](#) .

Note

Do not reuse used coolant.



- Install the front wheel housing liners. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing.
- After replacing the engine, adapt the chain length and select [01 - Chain Length Adaptation Diagnosis] in [Guided Functions]. Refer to Vehicle Diagnostic Tester.
- The adaptation values in the engine control module must be adapted after replacing the engine. To do so, turn on the ignition and select the following menu items on the Vehicle Diagnostic Tester:
 - ◆ [01 - Engine electronics]
 - ◆ [Guided Functions]
 - ◆ [01 - Adaptation after repair work on the chain drive]



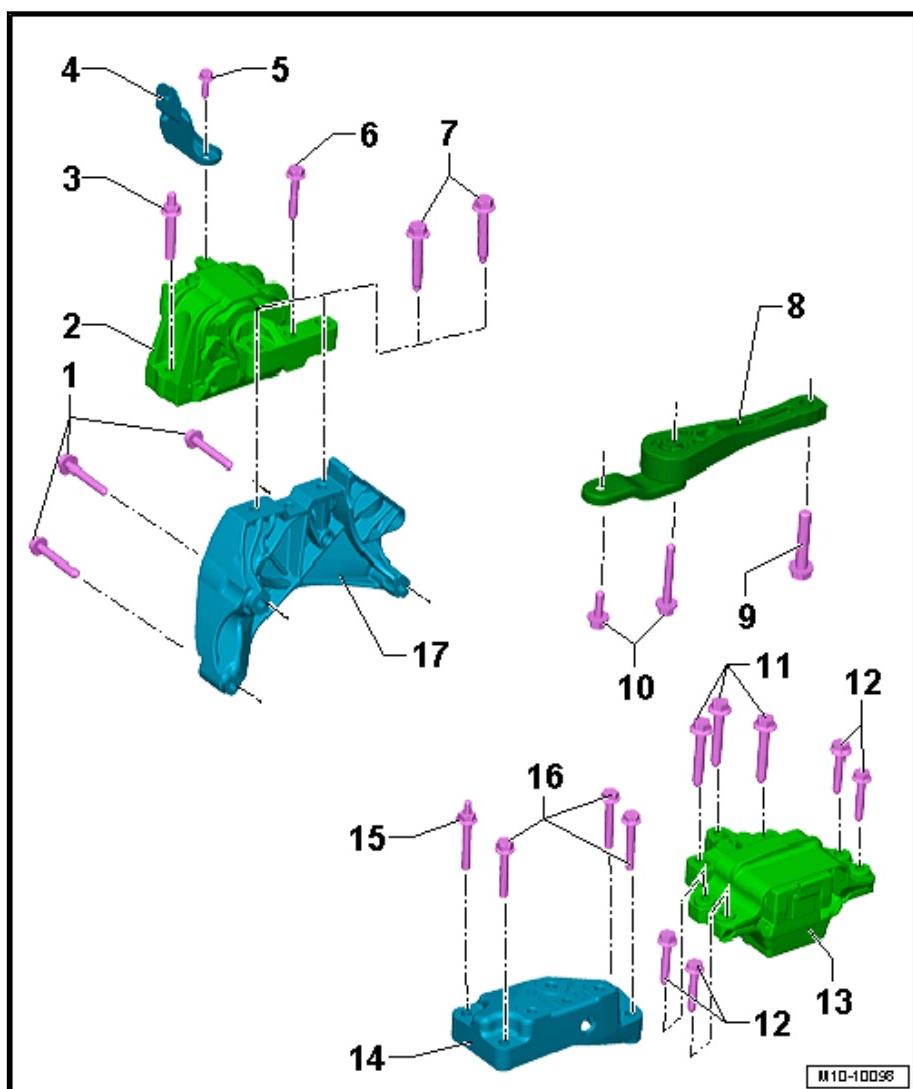
2 Subframe Mount

- ⇒ [-2.1 Subframe Mount", page 26](#)
- ⇒ [M2.2 Mount, Removing and Installing", page 29](#)
- ⇒ [M2.3 Mount, Removing and Installing", page 30](#)
- ⇒ [S2.4 Support, Removing and Installing", page 32](#)
- ⇒ [S2.5 Supporting in Installation Position", page 32](#)
- ⇒ [M2.6 Mount, Adjusting", page 37](#)
- ⇒ [M2.7 Mount, Checking Adjustment", page 38](#)

2.1 Overview - Subframe Mount

**1 - Bolt**

- Tightening specification. Refer to [Fig. "Engine Support - Tightening Specification and Sequence"](#), page 28.
- Replace after removing
- Engine support to engine

**2 - Engine Mount**

- Removing and installing. Refer to [M2.2 Mount, Removing and Installing](#), page 29.

3 - Bolt

- 40 Nm +90°
- Replace after removing
- Engine mount to body

4 - Bracket**5 - Bolt**

- 20 Nm +90°
- Replace after removing
- Bracket to engine mount and body

6 - Bolt

- 40 Nm +90°
- Replace after removing
- Engine mount to body

7 - Bolts

- 60 Nm +90°
- Replace after removing
- Engine mount to engine support

8 - Pendulum Support

- Removing and installing. Refer to [Fig. "Pendulum Support - Tightening Specification and Sequence"](#), page 29.
- First install pendulum support to the transmission and then to the subframe

9 - Bolt

- Tightening specification. Refer to [Fig. "Pendulum Support - Tightening Specification and Sequence"](#), page 29.
- Replace after removing
- Pendulum support to subframe

10 - Bolts

- Tightening specification. Refer to [Fig. "Pendulum Support - Tightening Specification and Sequence"](#), page 29.
- Replace after removing
- Pendulum support to transmission

11 - Bolt

- 60 Nm +90°
- Replace after removing



- Transmission mount to transmission support

12 - Bolt

- 40 Nm +90°
- Replace after removing
- Transmission mount to body

13 - Transmission Mount

- The illustration shows the DSG® transmission version

14 - Transmission Support

15 - Bolt

Tightening specification:

- Vehicles with a manual transmission. Refer to ⇒ Rep. Gr. 34; Transmission, Removing and Installing; Transmission Tightening Specifications.
- Vehicles with a DSG® transmission. Refer to ⇒ Rep. Gr. 34; Transmission, Removing and Installing; Transmission Tightening Specifications.
- Vehicles with automatic transmission. Refer to ⇒ Automatic Transmission; Rep. Gr. 37; Transmission, Removing; Transmission Tightening Specifications
- Double Bolt
- Transmission support to transmission

16 - Bolt

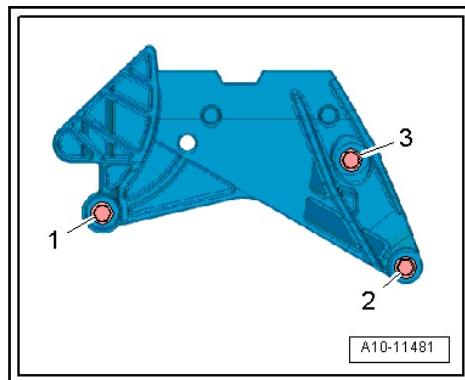
Tightening specification:

- Vehicles with a manual transmission. Refer to ⇒ Rep. Gr. 34; Transmission, Removing and Installing; Transmission Tightening Specifications.
- Vehicles with a DSG® transmission. Refer to ⇒ Rep. Gr. 34; Transmission, Removing and Installing; Transmission Tightening Specifications.
- Vehicles with automatic transmission. Refer to ⇒ Automatic Transmission; Rep. Gr. 37; Transmission, Removing; Transmission Tightening Specifications
- Transmission support to transmission

17 - Engine Support

- Removing and installing. Refer to [⇒ S1.6 upport, Removing and Installing”, page 62](#).

Engine Support - Tightening Specification and Sequence

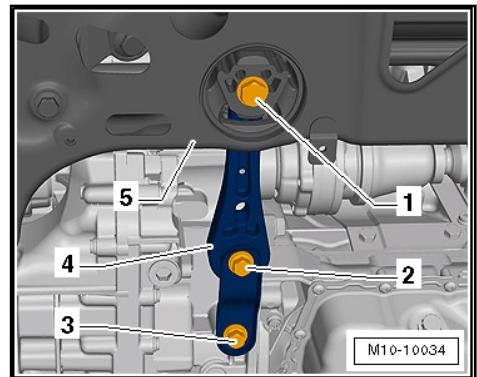


- Tighten the bolts in steps in the sequence -1 to 3-:

Step	Bolts	Tightening Specification/Additional Turn
1.	-1 through 3-	7 Nm
2.	-1 through 3-	40 Nm
3.	-1 through 3-	Turn an additional 90°.



Pendulum Support - Tightening Specification and Sequence



- First fasten the pendulum support -4- to the transmission and then to the subframe.
- Tighten the bolts in steps in the sequence shown:

Step	Bolts	Tightening Specification/Additional Turn
1.	-2 and 3-	50 Nm
2.	-1-	100 Nm
3.	-1 through 3-	Turn an additional 90°.

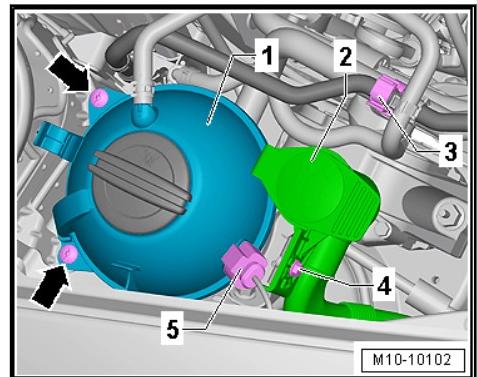
2.2 Engine Mount, Removing and Installing

Special tools and workshop equipment required

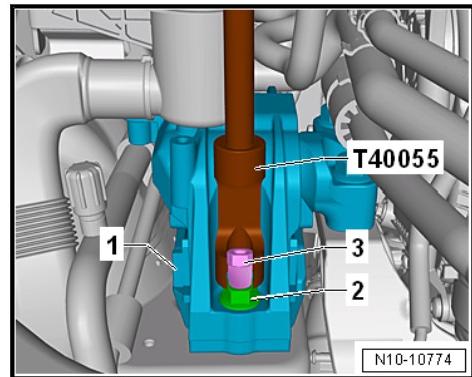
- ◆ Torque Wrench 1331 5-50Nm -VAG1331-
- ◆ Union Nut Socket - T40055-

Removing

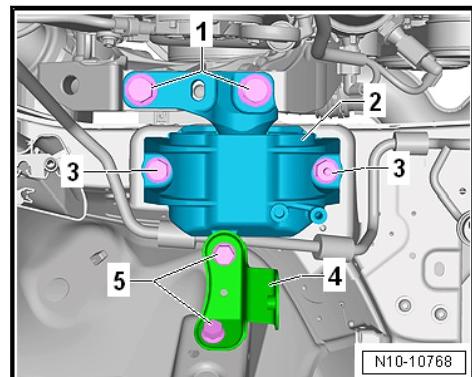
- Support the engine in the installation position. Refer to [S2.5 supporting in Installation Position](#), page 32 .
- Remove the bolt -4- and rotate the washer fluid reservoir filler tube -2- forward.



- Open the clip -3- and remove the connector -5- from the coolant expansion tank -1-.
- Remove the bolts -arrows- and place the coolant expansion tank -1- on the engine with the coolant lines connected.
- If equipped, remove the jump start terminal -3- on the front engine mount bolt -2- using the -T40055-.



- Remove the bolts -5- and the bracket -4-.



- Remove the bolts -1 and 3- and then remove the engine mount upward.

Installing

Install in reverse order of removal. Note the following:

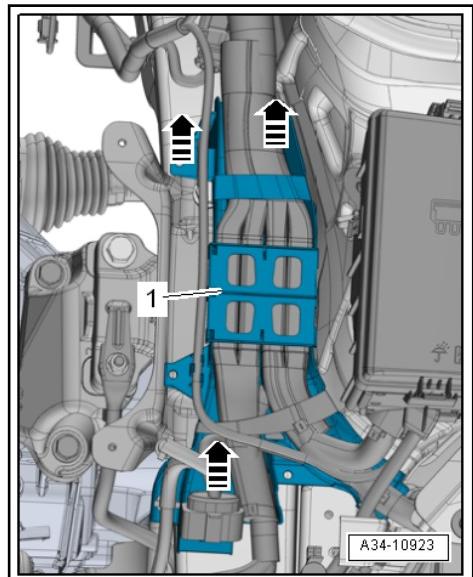
Tightening Specifications

- Refer to [-2.1 Subframe Mount", page 26](#)

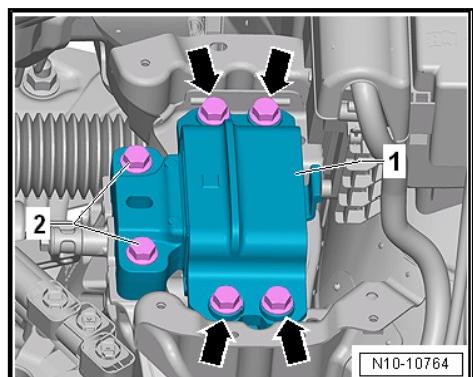
2.3 Transmission Mount, Removing and Installing

Removing

- Remove the air filter housing. Refer to [F3.2 Filter Housing, Removing and Installing", page 329](#).
- Battery tray. Refer to [Electrical Equipment; Rep. Gr. 27; Battery; Battery Tray, Removing and Installing](#).
- Remove the Engine Control Module -J623- from the bracket. Refer to [E6.1 Engine Control Module J623, Removing and Installing", page 350](#).
- Unclip the wiring guide -1- upward in direction of -arrows- and move it slightly to the side.



- Support the engine in the installation position. Refer to [S2.5 upporting in Installation Position](#), page 32 .
- Remove the bolts -2-, then the bolts -arrows- and remove the transmission mount -1-.



Installing

Install in reverse order of removal and note the following:



Note

- ◆ Replace the bolts that were tightened with an additional turn.
- ◆ The transmission support and the transmission mount support arm must be absolutely parallel to each other before installing the bolts. Push the rear of the transmission upward using a floor jack if necessary.

- Secure the transmission support to the longitudinal member.
- Lift the transmission using the engine support bridge spindle until the transmission support touches the support arm.
- Position bolts by hand. While doing so, make sure that the bolts are not installed crooked.
- Check the adjustment of the subframe mount. Refer to [M2.7 ount, Checking Adjustment](#), page 38 .
- Remove the -10-222A- from the engine.



Tightening Specifications

- ◆ Refer to [⇒ -2.1 Subframe Mount", page 26](#)
- ◆ Refer to ⇒ Electrical Equipment; Rep. Gr. 27; Battery; Overview - Battery.

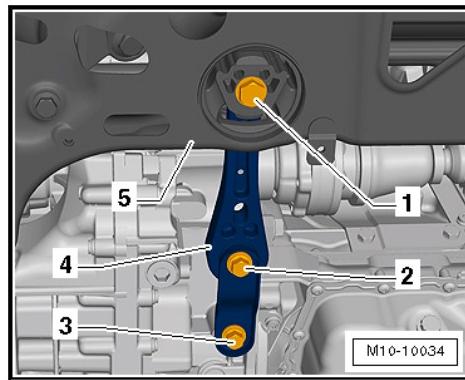
2.4 Pendulum Support, Removing and Installing

Special tools and workshop equipment required

- ◆ Torque Wrench 1331 5-50Nm -VAG1331-

Removing

- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Remove the bolt -1-.



- Remove the bolts -2 and 3-.
- Remove the pendulum support.

Installing

Install in reverse order of removal. Note the following:

- Install the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.

Tightening Specifications

- ◆ Refer to [⇒ -2.1 Subframe Mount", page 26](#)

2.5 Engine, Supporting in Installation Position

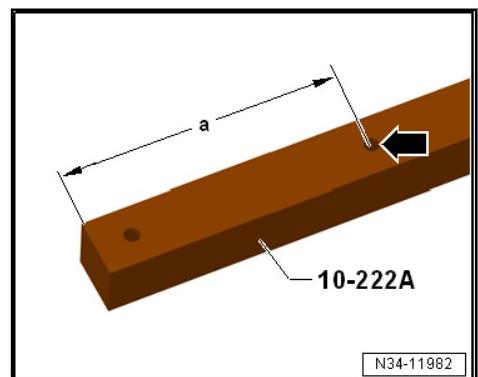
Special tools and workshop equipment required

- ◆ Engine Support - Movable Joint -T40093/4- (quantity: 2) from the Engine Support - Supplement Kit -T40093A-
- ◆ Engine Support - Mount -T40093/5- (quantity: 2) from the Engine Support - Supplement Kit -T40093A-
- ◆ Engine Support - Basic Set - Square Pipe -T40091/1- (quantity: 2) from the Engine Support - Basic Set -T40091-
- ◆ Engine Support - Basic Set - Rail with Holes -T40091/2- (quantity: 1) from the Engine Support - Basic Set -T40091-
- ◆ Engine Support - Basic Set - Movable Joint -T40091/3- (quantity: 2) from the Engine Support - Basic Set -T40091-
- ◆ Square Pipe with Two Bolts (quantity: 1) from the Engine Support Bridge -10-222A-



- ◆ Engine Support Bridge - Spindle -10-222A/11- or Engine Support - Bracket w/Spindle and Hook -10-222A10- from the Engine Support Bridge -10-222A- (quantity: 2)
- ◆ Engine Support - Adapter -10-222A/31A-1- (quantity: 1)
- ◆ Engine Support - Adapter -10-222A/31A-2- (quantity: 1)
- ◆ Engine Support Bridge - Engine Support 28 -10-222A/28- (quantity: 2)
- ◆ Engine Support Bridge - Engine Support 28-1 -10-222A/28-1- (quantity: 2)
- ◆ Engine Support Bridge - Special Hook (2 pc.) -10-222A/20- (quantity: 1)
- ◆ Torque Wrench 1331 5-50Nm -VAG1331-

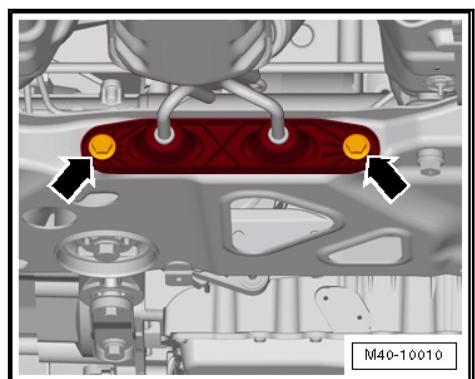
Tools, Preparing



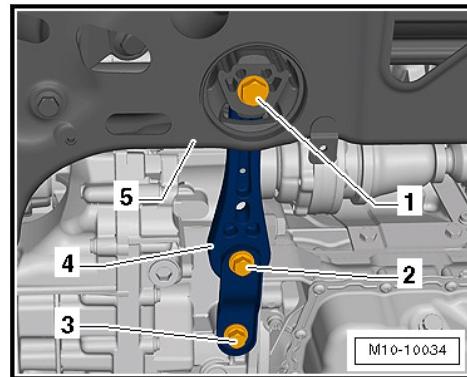
- If the adapter for -10-222A- does not have the hole indicated by the -arrow-, it must be added.
- Dimension -a- = 225 mm.
- Hole diameter = 12.5 mm

Procedure

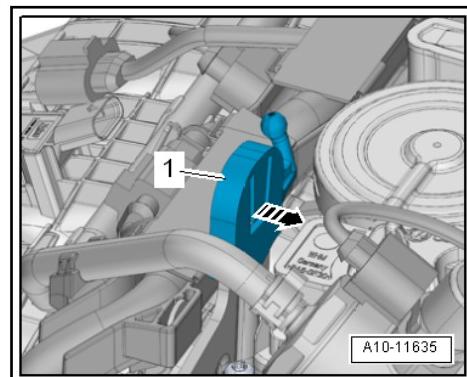
- Remove the exhaust system bracket from the subframe -arrows-.



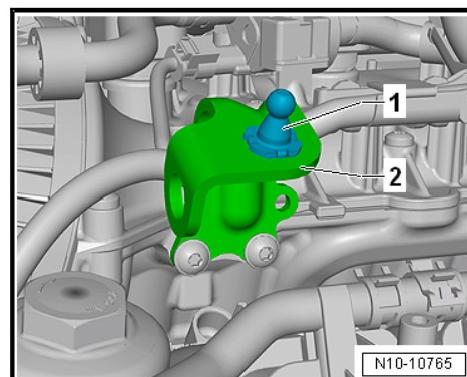
- Remove the bolt -1-.



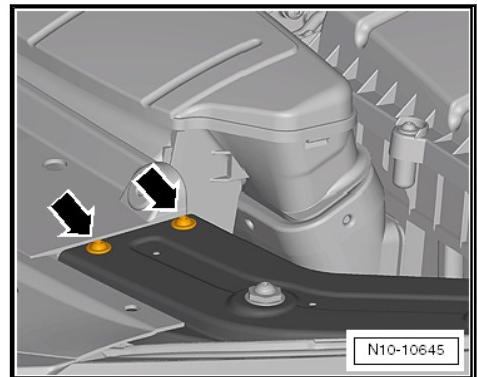
- Remove the bolts -2 and 3-.
- Remove the pendulum support -4-.
- Remove the plenum chamber cover. Refer to ⇒ Body Exterior; Rep. Gr. 50; Bulkhead; Plenum Chamber Cover, Removing and Installing.
- Remove the engine cover. Refer to ⇒ C3.1 over, Removing and Installing", page 40 .
- Release the retainer in direction of -arrow- and remove the engine cover mount -1-.



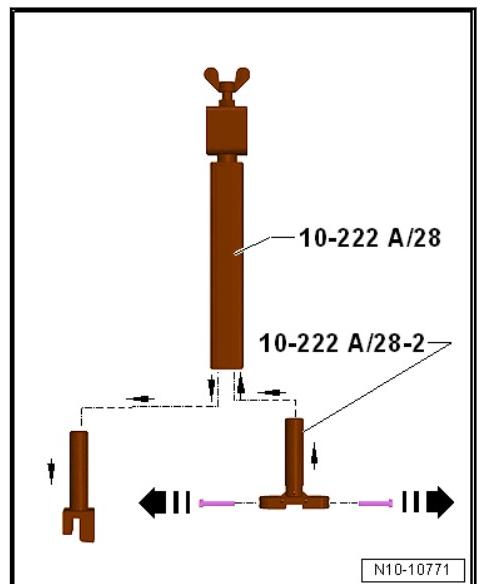
- Unclip the right engine cover mount -1- from the locating bore -2-.



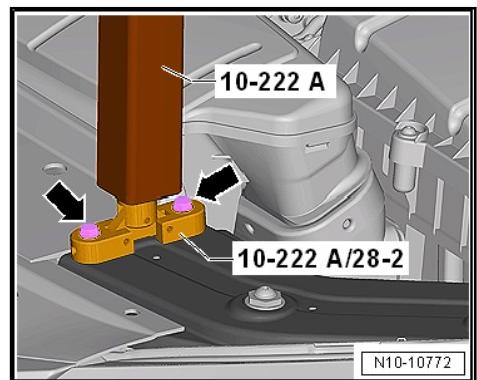
- Remove the air filter housing. Refer to ⇒ F3.2 ilter Housing, Removing and Installing", page 329 .
- Remove the battery and the battery tray. Refer to ⇒ Electrical Equipment; Rep. Gr. 27; Battery; Battery Tray, Removing and Installing.
- Remove the bolts -arrows- for the left and right sides of the lock carrier bracket.



- Remove the lower mounts on the -10-222A/28- and replace with the -10-222A/28-2-.



- Remove the bolts -arrows- for securing the engine support bridge on the lock carrier from the -10-222A/28-2-.
- Use the bolts from the -10-222A/28-2- for attaching the -10-222A/28-. Do not use the bolts for the bracket.



Tightening Specification

Bolts	Tightening Specification
-arrows-	8 Nm

- A second technician is needed when positioning the -10-222A- on the vehicle to keep the -10-222A- from tipping.

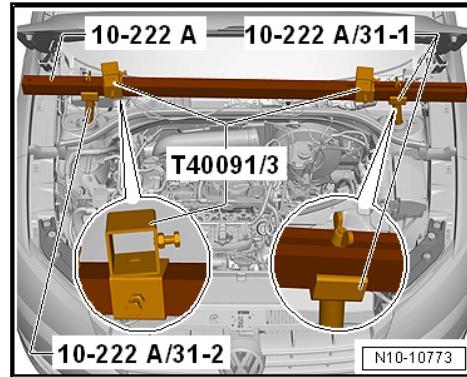


Jetta 2011 >, Jetta 2015 >

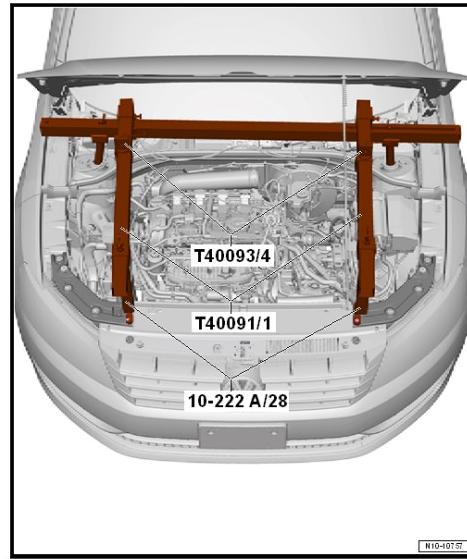
4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

Engine Support Bridge, Mounting as Follows for Supporting Engine/Transmission Assembly

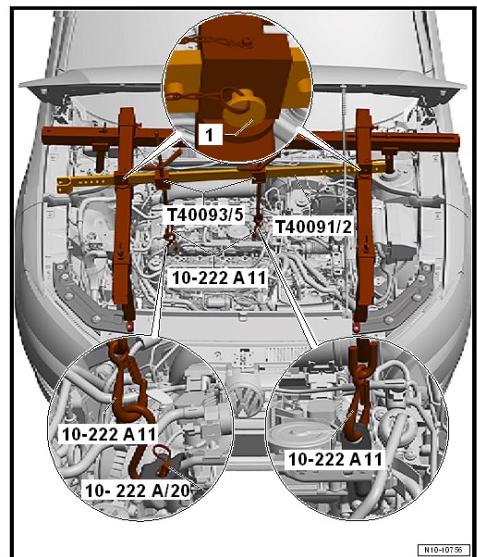
- First slide the -T40091/3- onto the Square Pipe of the -10-222A-.



- The bolts for the -T40091/3- point in the direction of travel as shown in the -illustration-.
- Connect the -10-222A/31-1- and -10-222A/31-2- with the -10-222A- as shown in the -illustration-, but do not tighten them yet.
- Mount the -10-222A- on the suspension strut towers and have a second technician hold it to prevent it from tipping.
- Slide the -T40091/1- on the left and right through the -10-222A/28- from the front.



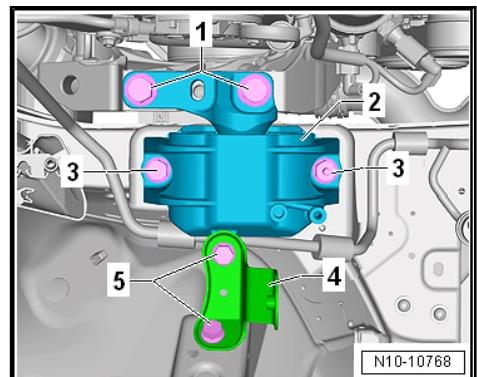
- Before connecting to the rear of the -10-222A-, slide an -T40093/4- onto each and attach to the -10-222A-.
- Slide the -T40091/2- through an -T40093/4- and position both -T40093/5-.



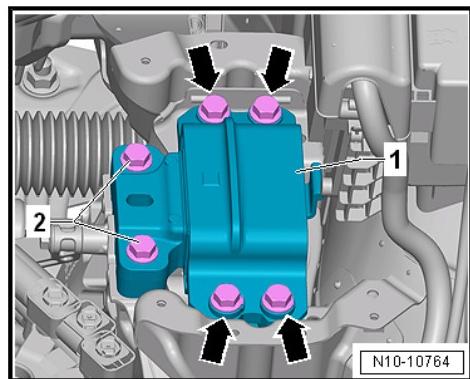
- Guide the -T40091/2- through the second -T40093/4-.
- Insert the locking pin -1- into the -T40091/2- as shown in the -illustration- and secure with cotter pins.
- Tighten all threaded connections on the -10-222A- hand-tight. Adjust the height of the -10-222A- parallel over the -10-222A/28- while doing so.
- Insert the -10-222A/11- as shown in the -illustration-, connect them to the engine/transmission assembly and lightly pretension it, but do not lift.

2.6 Subframe Mount, Adjusting

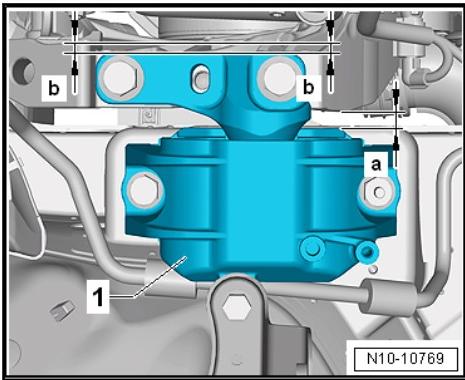
- Support the engine with the transmission but do not lift it.
Refer to [S2.5 upporting in Installation Position](#), page 32 .
- Replace the subframe mount bolts -1, 3, and 5- one after the other as long as this was not already done when installing the engine and hand tighten.



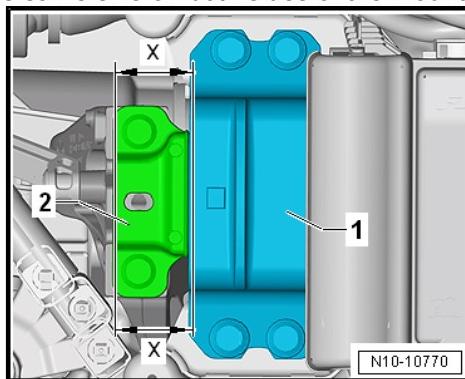
- Replace the subframe mount bolts -2- one after the other (if the was not already performed with the engine was installed) and hand tighten.



- Install the left and right support arm bolts just enough so that the mount can still be moved.
- There must be a distance -a- of 10 mm between the engine support and right longitudinal member.
- The casting edge on the engine support must be parallel to the engine mount support arm.
- Dimension -b- = Dimension -b-.



- Make sure that the edges on the support arm -2- and transmission mount -1- are parallel on the transmission side.
- Dimension -x- is the same size on both sides of the mount.



- Tighten the subframe mount bolts.

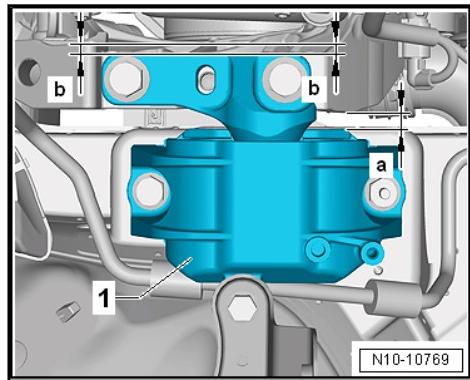
Installation is performed in reverse order of the removal.

Tightening Specifications

- ♦ Refer to [-2.1 Subframe Mount](#), page 26

2.7 Subframe Mount, Checking Adjustment

- There must be a distance -a- of 10 to 13 mm between the engine support and right longitudinal member.



- The casting edge on the engine support must be parallel to the engine mount support arm.
- Dimension -a- = Dimension -b-.



Note

Distance -a- can also be checked using a suitable round stock.

Only If There Is Noise (the Engine or Transmission Hitting the Longitudinal Member When Driving around Curves) and Dimension -a- is Not within 10 to 13 mm:

- Adjust the subframe mount. Refer to [M2.6 Mount, Adjusting](#), page 37 .



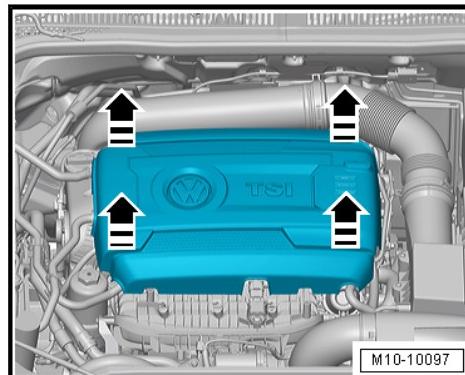
3 Engine Cover

⇒ C3.1 over, **Removing and Installing**, page 40

3.1 Engine Cover, Removing and Installing

Removing

- Carefully pull the engine cover off the retaining pins in direction of -arrows- one after the other. Do not pull sharply on the engine cover or pull it to one side.



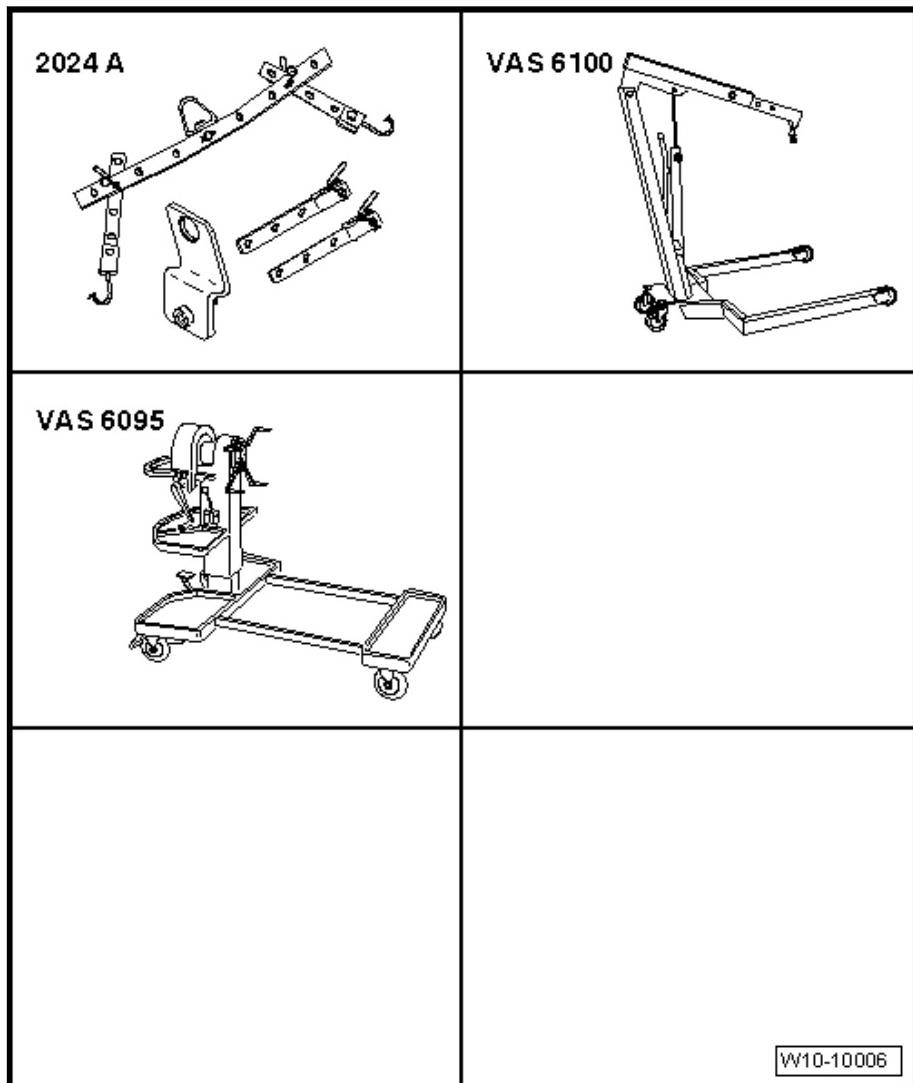
Installing

- To prevent damage to the engine cover, do not hit it with a fist or a tool.
- Position the engine cover while paying attention to the oil filler tube and oil dipstick.
- Press the engine cover into the rubber grommets on the left side first, then into the ones on the right side.



4 Special Tools

Special tools and workshop equipment required

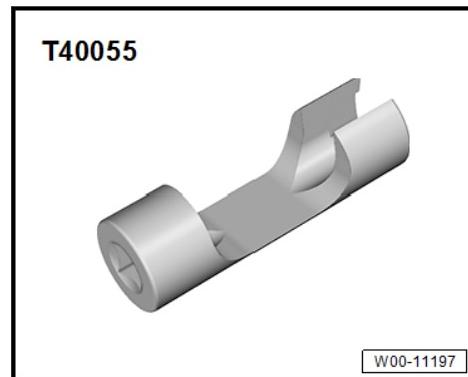


- ◆ Engine Sling -2024A-
- ◆ Engine and Gearbox Bracket -VAS6095A-
- ◆ Shop Crane -VAS6100-
- ◆ Locking Pin -T10060A-

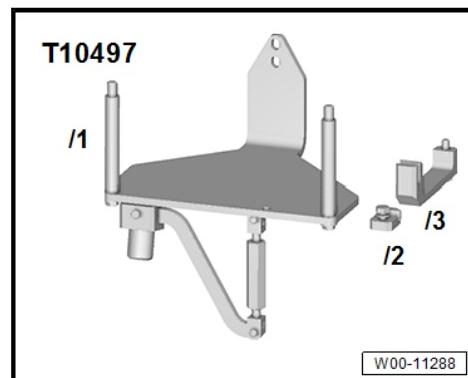




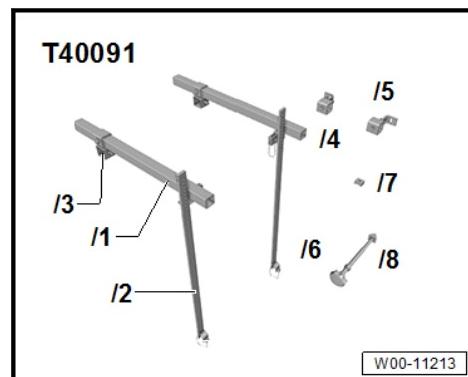
- ◆ Union Nut Socket - T40055-



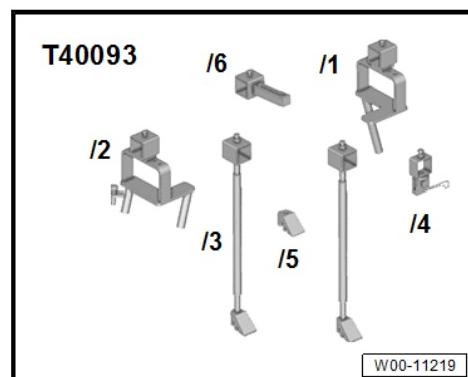
- ◆ Engine Support -T10497- with Pins -T10497/1-



- ◆ Engine Support - Basic Set - Square Pipe -T40091/1- (quantity: 2) from the Engine Support - Basic Set -T40091-
- ◆ Engine Support - Basic Set - Rail with Holes -T40091/2- (quantity: 1) from the Engine Support - Basic Set -T40091-
- ◆ Engine Support - Basic Set - Movable Joint -T40091/3- (quantity: 2) from the Engine Support - Basic Set -T40091-



- ◆ Engine Support - Movable Joint -T40093/4- (quantity: 2) from the Engine Support - Supplement Kit -T40093A-
- ◆ Engine Support - Mount -T40093/5- (quantity: 2) from the Engine Support - Supplement Kit -T40093A-





- ◆ Torque Wrench 1331 5-50Nm -VAG1331-

V.A.G 1331

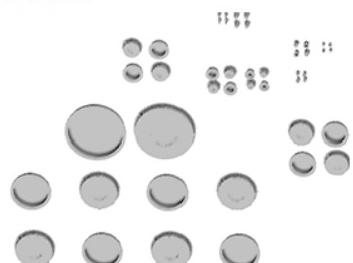
W00-11166

- ◆ Shop Crane -VAS6100-

VAS 6100

W00-11307

- ◆ Engine Bung Set -VAS6122-

VAS 6122

W00-11228

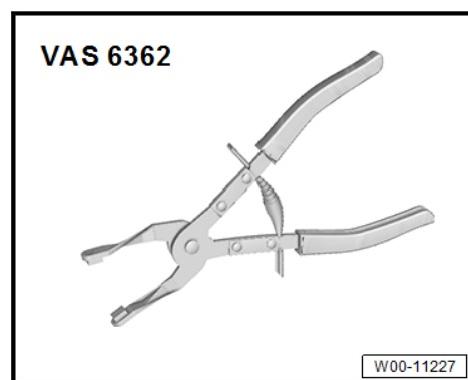
- ◆ Shop Crane - Drip Tray -VAS6208-

VAS 6208

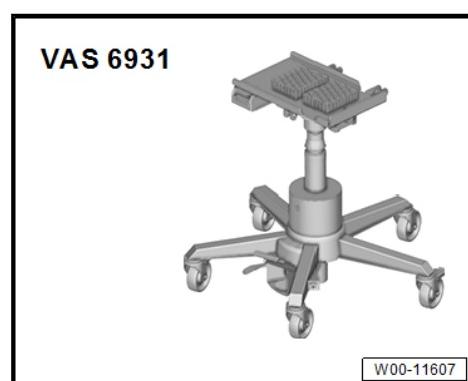
W00-11209



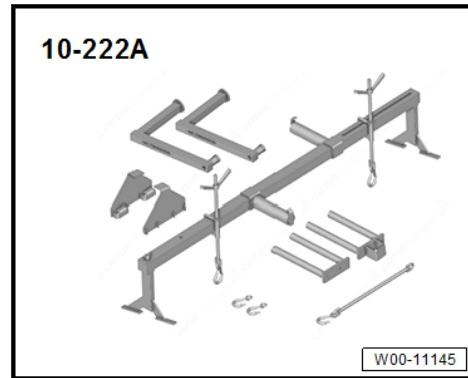
- ◆ Hose Clip Pliers -VAS6362-



- ◆ Engine and Gearbox Jack -VAS6931-



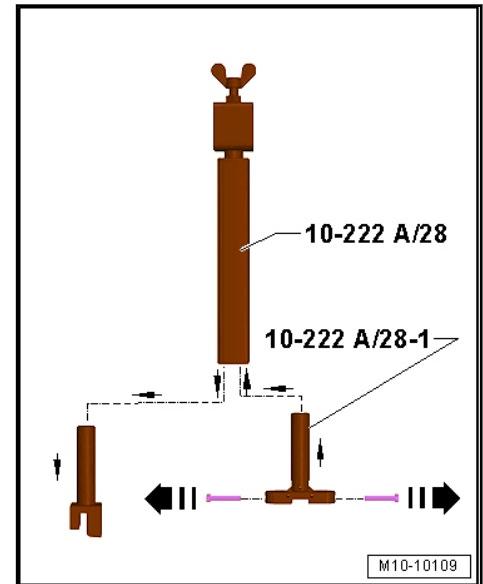
- ◆ Square Pipe with Two Bolts (quantity: 1) from the Engine Support Bridge -10-222A-
- ◆ Engine Support Bridge - Spindle -10-222A/11- or Engine Support - Bracket w/Spindle and Hook -10-222A10- from the Engine Support Bridge -10-222A- (quantity: 2)



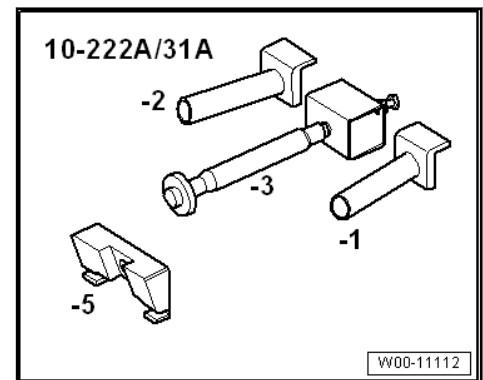
- ◆ Engine Support Bridge - Engine Support 28 -10-222A/28- (quantity: 2)



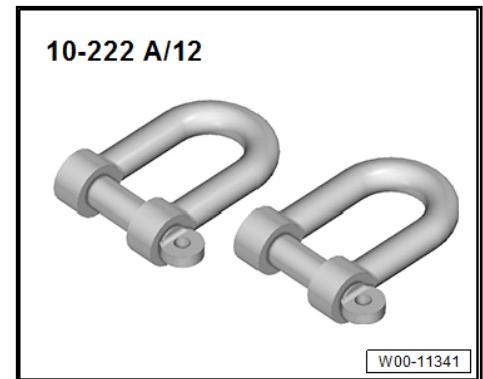
- ◆ Engine Support Bridge - Engine Support 28-1 -10-222A/28-1- (quantity: 2)



- ◆ Engine Support - Adapter -10-222A/31A-1- (quantity: 1)
- ◆ Engine Support - Adapter -10-222A/31A-2- (quantity: 1)

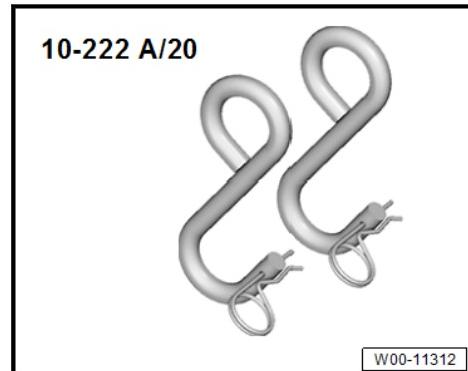


- ◆ Engine/Gearbox Support Shackle (2 pc.) -10-222A/12-

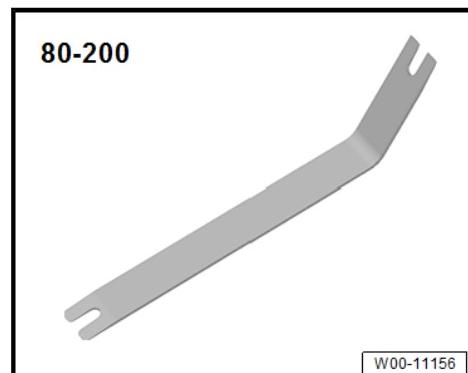




- ◆ Engine Support Bridge - Special Hook (2 pc.) -10-222A/20-
(quantity: 1)



- ◆ Pry Lever -80-200-



- ◆ Not Illustrated:
- ◆ Engine Support - Clamp -T10497/4-
- ◆ Protective Mat -VAS531003-
- ◆ Commercially Available Step Ladder
- ◆ Protective Eyewear
- ◆ Safety Gloves



13 – Crankshaft, Cylinder Block

1 Cylinder Block, Belt Pulley Side

⇒ [-1.1 Cylinder Block, Belt Pulley Side", page 47](#)

⇒ [B1.2 elt, Removing and Installing", page 49](#)

⇒ [B1.3 elt Tensioner, Removing and Installing", page 51](#)

⇒ [D1.4 amper, Removing and Installing", page 51](#)

⇒ [B1.5 racket, Removing and Installing", page 58](#)

⇒ [S1.6 upport, Removing and Installing", page 62](#)

1.1 Overview - Cylinder Block, Belt Pulley Side



1 - Ribbed Belt

- Check for wear
- Do not kink
- Ribbed belt routing. Refer to [page 50](#)
- Removing and installing. Refer to [B1.2 elt, Removing and Installing](#), page 49 .
- When installing, make sure it is seated correctly on the belt pulleys

2 - Ribbed Belt Tensioner

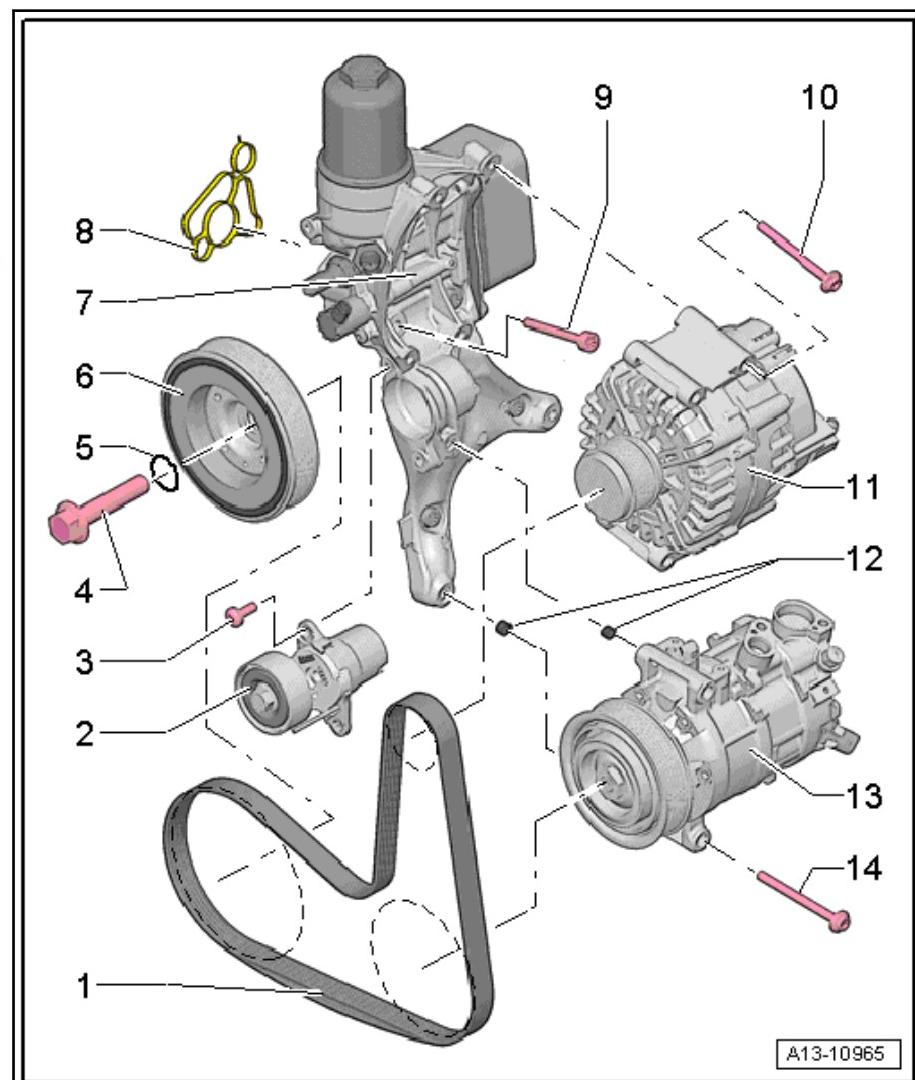
- To release tension on the ribbed belt, pivot using an open end wrench.
- Secure using the - T10060A-
- Removing and installing. Refer to [B1.3 elt Tensioner, Removing and Installing](#), page 51 .

3 - Bolt

- 8 Nm +45°
- Replace after removing

4 - Bolt

- 150 Nm +90°
- Replace after removing
- Use the -T10355- to loosen and tighten



5 - O-ring

- Not a replacement part; supplied with the bolt

6 - Vibration Damper

- With ribbed belt pulley
- Removing and installing. Refer to [D1.4 amper, Removing and Installing](#), page 51 .

7 - Sub-Assembly Bracket

- Removing and installing. Refer to [B1.5 racket, Removing and Installing](#), page 58 .

8 - Seal

- Replace after removing

9 - Bolt

- Tightening specification and sequence. Refer to [Fig. "Sub-Assembly Bracket - Tightening Specifications and Sequence"](#), page 49 .

10 - Bolt

- Tightening specification. Refer to [Electrical Equipment; Rep. Gr. 27; Generator; Overview - Generator](#).

11 - Generator

- Overview. Refer to [Electrical Equipment; Rep. Gr. 27; Generator; Overview - Generator](#).

12 - Alignment Sleeves

- For the A/C compressor



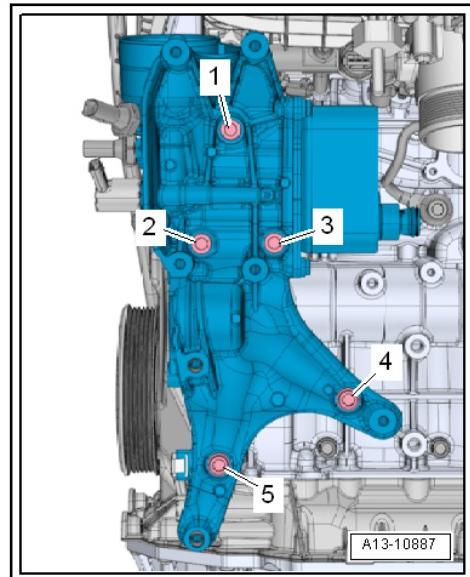
13 - A/C Compressor

- Do not remove or disconnect refrigerant lines
- Overview. Refer to ⇒ Rep. Gr. 87; A/C Compressor; Overview - A/C Compressor Power Unit.

14 - Bolt

- Tightening specification. Refer to ⇒ Rep. Gr. 87; A/C Compressor; Overview - A/C Compressor Power Unit.

Sub-Assembly Bracket - Tightening Specifications and Sequence



- Mount the sub-assembly bracket and then install the bolt -4- by hand.



Note

Replace the bolts that were tightened with an additional turn.

- Tighten the bolts in the sequence -1 to 5- in three stages as follows:

Step	Bolts	Tightening Specification/Additional Turn
1.	-1 through 5-	Tighten hand-tight
2.	-1 through 5-	20 Nm
3.	-1 through 5-	Turn an additional 90°.

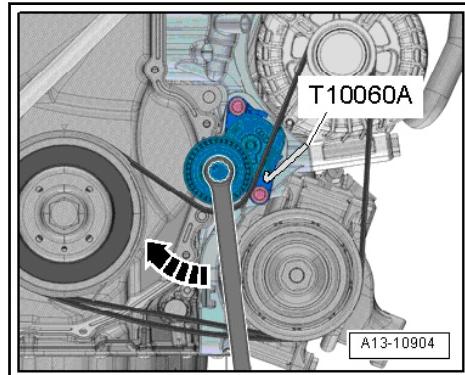
1.2 Ribbed Belt, Removing and Installing

Special tools and workshop equipment required

- ◆ Locking Pin -T10060A-

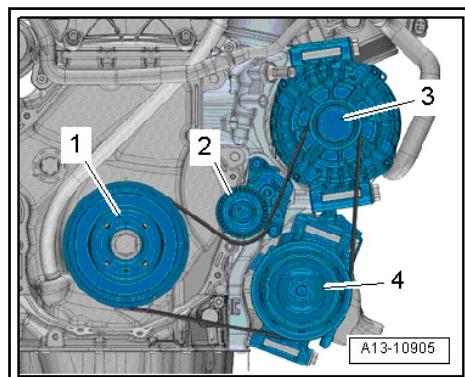
Removing

- If the ribbed belt is going to be reinstalled, the running direction must be marked with chalk or a felt-tip pen for reinstallation.
- To release the tension on the ribbed belt, turn the tensioner in the direction of -arrow-.

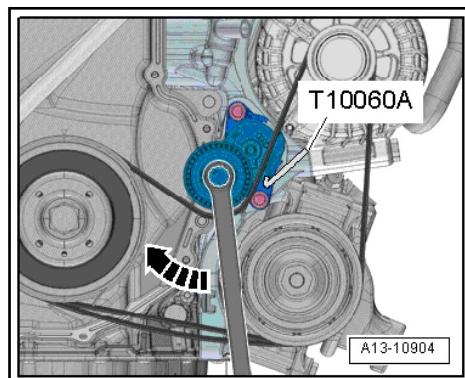


- Secure the tensioner using the -T10060A-.
- Remove the ribbed belt.

Installing



- When a used ribbed belt is being installed, pay attention to the running direction.
 - Position the ribbed belt as illustrated.
- 1 - Vibration Damper
2 - Ribbed Belt Tensioner
3 - Generator
4 - A/C Compressor
- Turn the tensioner in the direction of -arrow- and remove the -T10060A-.



- Release the tension on the tensioner.
- Check whether the ribbed belt is routed correctly.

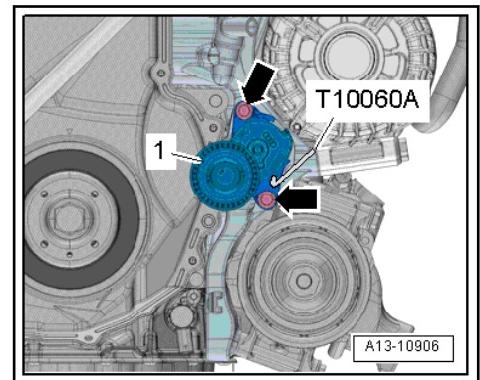


- Start the engine and check whether the ribbed belt runs correctly.

1.3 Ribbed Belt Tensioner, Removing and Installing

Removing

- Remove the right front wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing.
- Remove the ribbed belt from the tensioner. Refer to ⇒ [B1.2 elt, Removing and Installing](#), page 49 .
- Remove the bolts -arrows- and remove the ribbed belt tensioner -1- from the sub-assembly bracket.



Installing

Install in reverse order of removal and note the following:

- Install the ribbed belt. Refer to ⇒ [B1.2 elt, Removing and Installing](#), page 49 .
- Install the right wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing.

Tightening Specifications

- ◆ Refer to ⇒ [-1.1 Cylinder Block, Belt Pulley Side](#), page 47

1.4 Vibration Damper, Removing and Installing

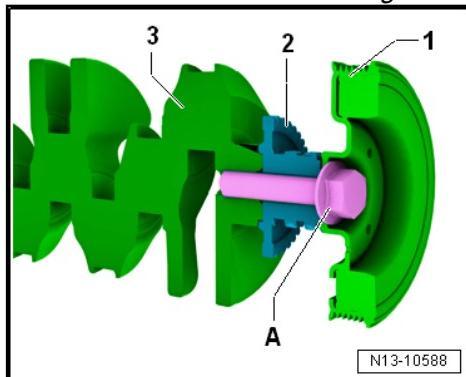
Special tools and workshop equipment required

- ◆ Counterhold - Vibration Damper -T10355-
- ◆ Vibration Damper Assembly Tool -T10531-



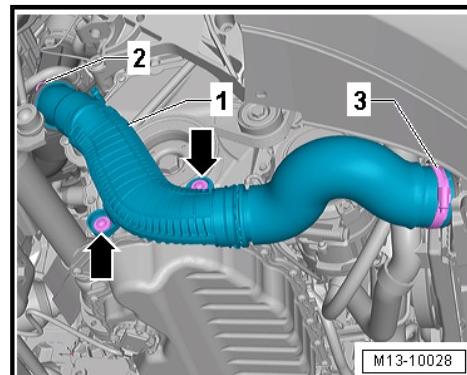
Note

The vibration damper bolt -A- connects the vibration damper -1-, the timing chain sprocket -2- and the crankshaft -3- with each other. Before removing the bolt, the chain sprocket must be secured to the crankshaft as described in the following.

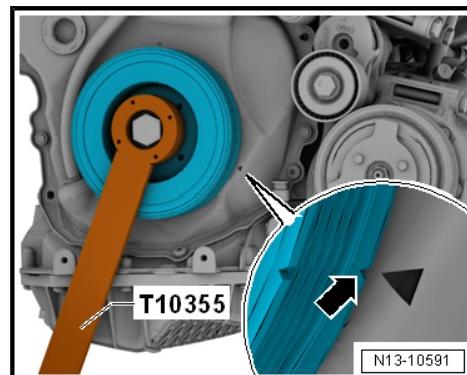


Removing

- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Remove the right wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing.
- Remove the bolts -arrows-.

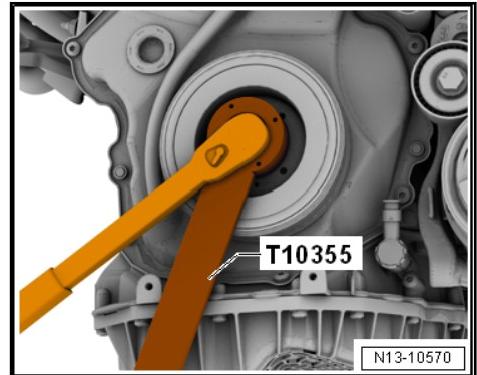


- Remove the air duct pipe by lifting the clip -2- and opening the screw-type clamp -3-.
- Remove the ribbed belt. Refer to [⇒ B1.2 elt, Removing and Installing](#), page 49 .

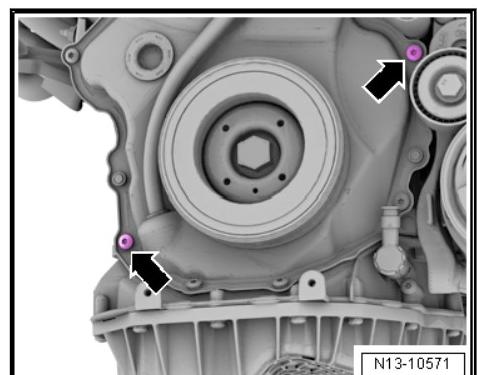




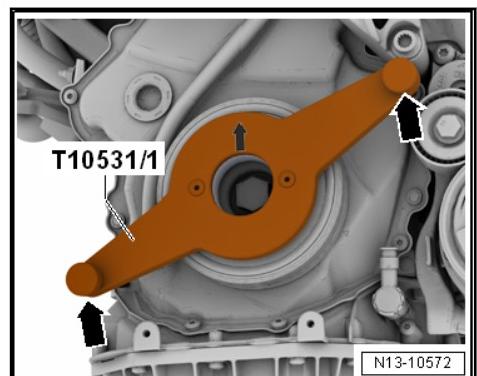
- Remove the -T10060A- from the ribbed belt tensioner.
- Turn the vibration damper to TDC -arrow- using the -T10355-.
- The notch on the vibration damper must align with the arrow marking on the lower timing chain cover.
- The marking on the cover is located in the »four-o'clock position«.
- Loosen the vibration damper bolt approximately $\frac{1}{2}$ turn by using the -T10355-.



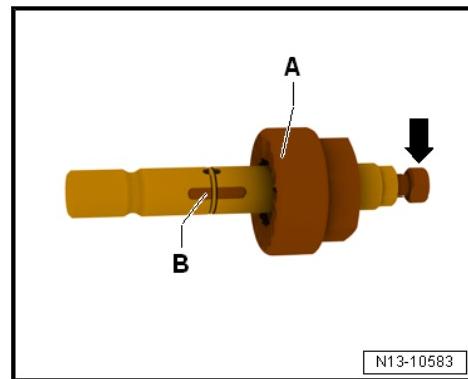
- If the vibration damper was turned, correct to TDC.
- Remove the two bolts -arrows- shown for the timing chain cover. The bolts must be replaced.



- Place the -T10531/1- as shown on the vibration damper and tighten it hand-tight using the knurled bolts -arrows-.



- Remove the vibration damper bolt completely.
- Check if the -T10531/3- -A- can be easily pushed over the clamping piece -B-. Turn the adjusting bolt -arrow-.



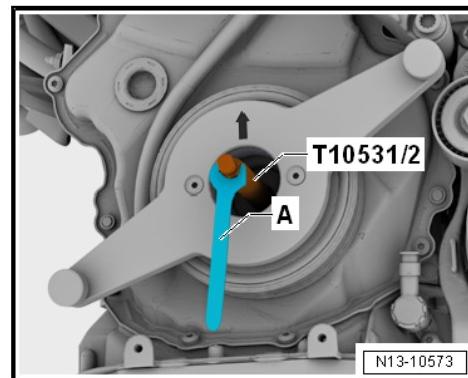
N13-10583



Note

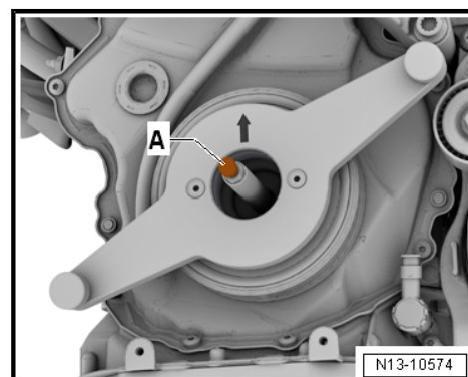
Do not turn the adjusting bolt further, otherwise the -T10531/2- becomes jammed in the crankshaft when installing.

- Install the -T10531/2- in the crankshaft and tighten it hand-tight using a 12 mm open end wrench -A-.



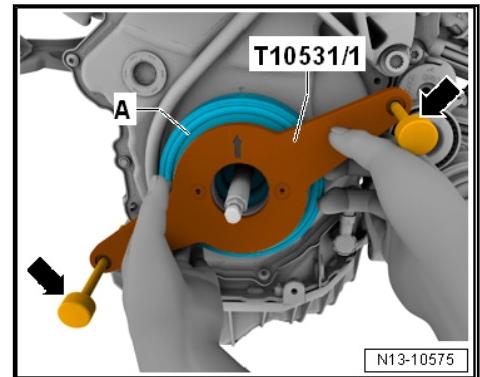
N13-10573

- Tighten the adjusting bolt -A- hand-tight. The chain sprocket is secured to the crankshaft as a result.

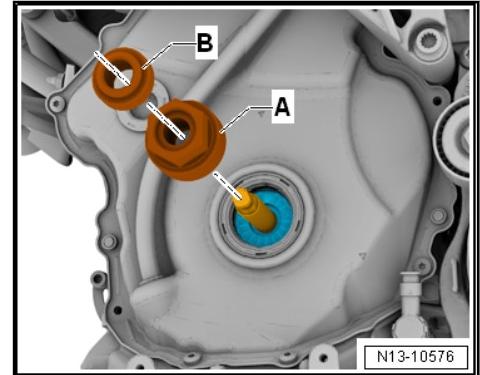


N13-10574

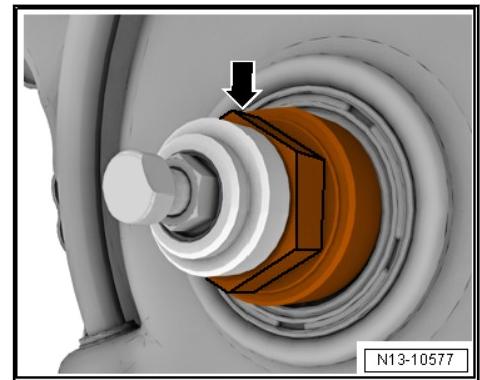
- Remove the knurled bolts -arrows-. Remove the -T10531/1- and vibration damper -A-.



If the Crankshaft Is Turned without the Vibration Damper:

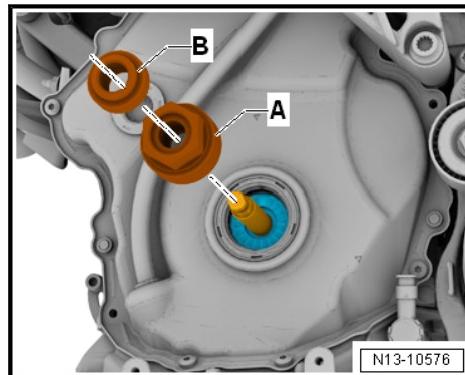


- Place the -T10531/3- -A- on the tensioning pin. While doing so, pay attention to the chain sprocket tooth contour. The flat side of the tool is at the top in TDC. Tighten the -T10531/3- with the -T10531/4- -B-.
- The crankshaft can now be turned at the hex fitting -arrow-.

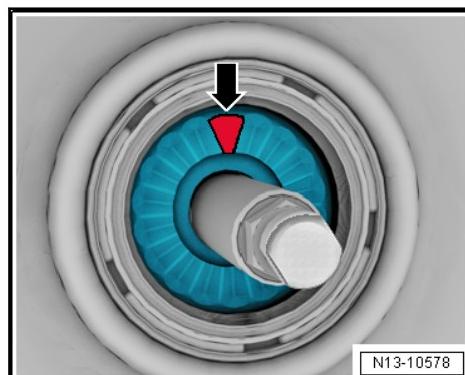


Vibration Damper, Installing:

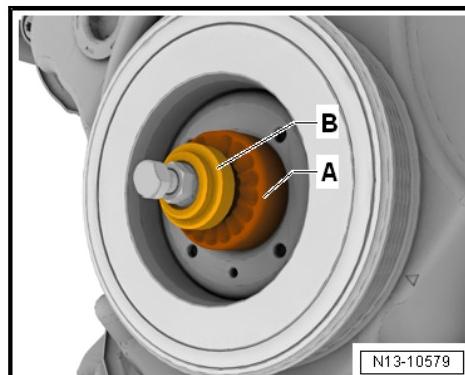
- If necessary, remove the -T10531/4- -B- and the -T10531/3- -A- from the tensioning pin.



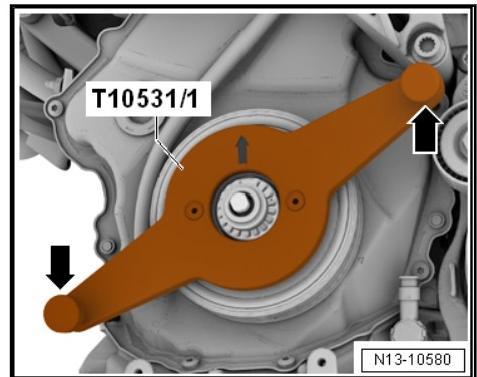
- Attach the vibration damper in TDC. While doing so, pay attention to the tooth contour of the chain sprocket -arrow-.



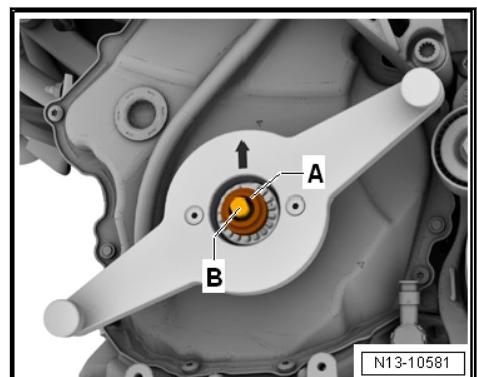
- Place the -T10531/3- -A- on the tensioning pin. While doing so, the hex fitting points to the vibration damper.
- Install the -T10531/4- -B-. While doing so, move the vibration damper back and forth slightly to check if the vibration damper is seated correctly in the tooth contour. Tighten the collar nut until the vibration damper can no longer be turned.



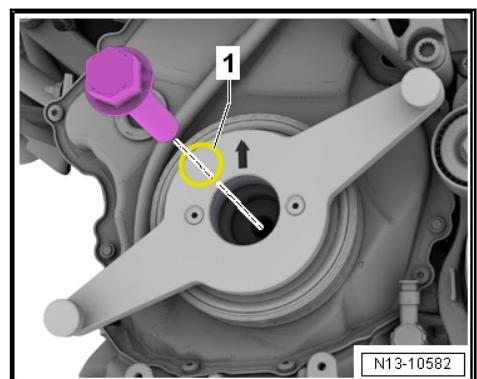
- Place the -T10531/1- as shown on the vibration damper and tighten it hand-tight using the knurled bolts -arrows-.



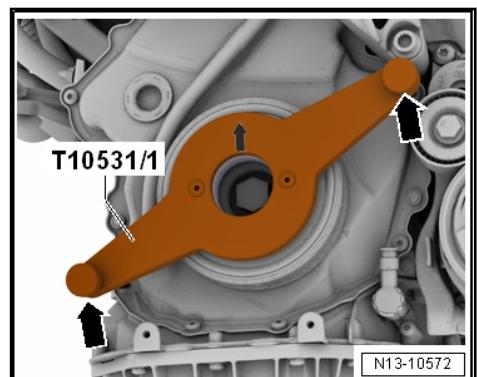
- Remove the -T10531/4- -A- and loosen the adjusting bolt -B-. Remove the -T10531/2- and remove with -T10531/3-.



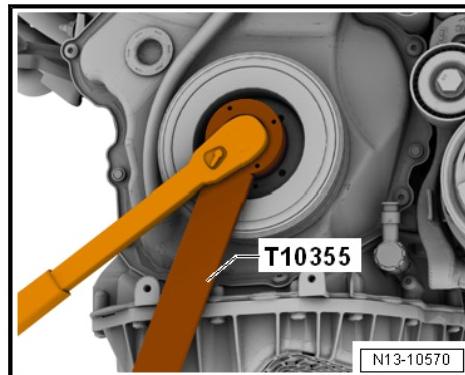
- Install a new vibration damper bolt hand-tight with an oiled O-ring -1-.



- Remove the knurled bolts -arrows- and remove the -T10531/1-.

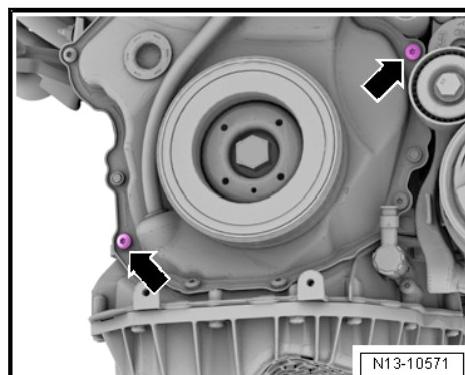


- Tighten the vibration damper bolt using the -T10355-.



- Install new bolts -arrows-.

Further assembly is performed in the reverse order of the removal.



Tightening Specifications

- ◆ Refer to [-1.1 Cylinder Block, Belt Pulley Side", page 47](#)
- ◆ Refer to [Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.](#)

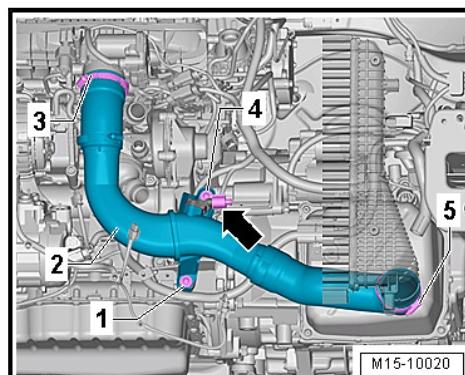
1.5 Sub-Assembly Bracket, Removing and Installing

Special tools and workshop equipment required

- ◆ Shop Crane - Drip Tray -VAS6208-

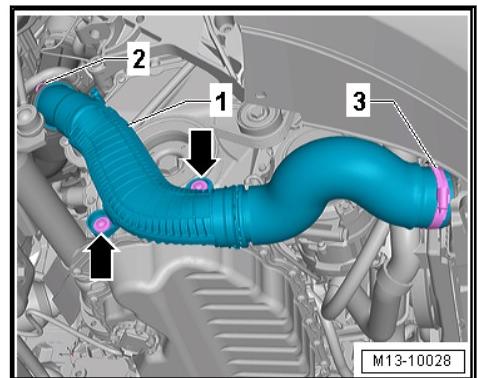
Removing

- Drain the coolant. Refer to [D1.3 raining and Filling", page 239](#).
- Loosen the hose clamp -3 and 5-.

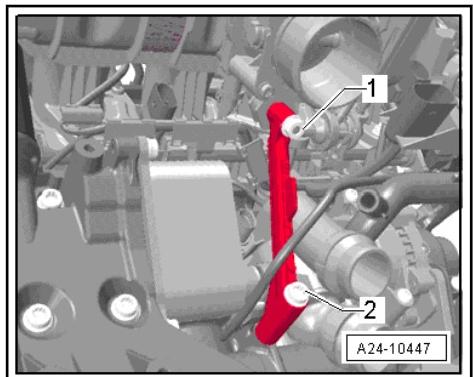




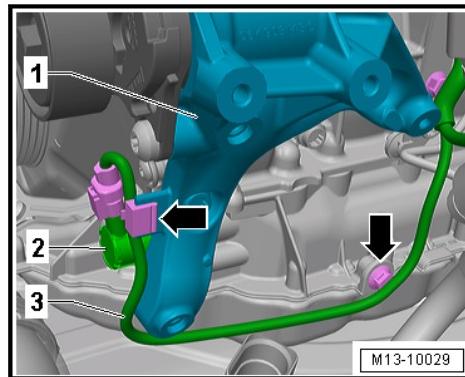
- Disconnect the connector from the Charge Air Pressure Sensor -G31- -arrow-.
- Remove the bolts -1 and 4- and then remove the air duct pipe downward.
- Remove the fan shroud. Refer to ⇒ S4.5 hroud, Removing and Installing”, page 273 .
- Remove the right front wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing.
- Cover the radiator with a suitable materials to prevent damage.
- Remove the bolts -arrows-.



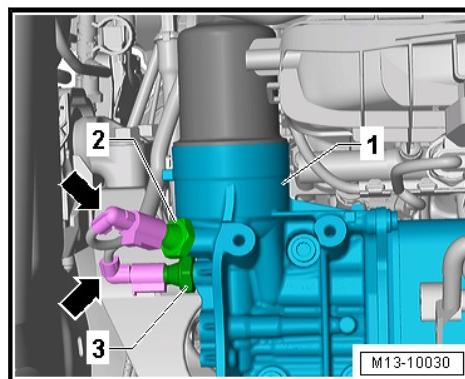
- Remove the air duct pipe by lifting the clip -2- and opening the screw-type clamp -3-.
- Disconnect the connector from the A/C compressor.
- Remove the A/C compressor bolts and remove the A/C compressor with the refrigerant lines attached from the sub-assembly bracket.
- Remove the intake manifold support by removing the nut -1- and bolt -2-.



- Remove the generator. Refer to ⇒ Electrical Equipment; Rep. Gr. 27; Generator; Generator, Removing and Installing.
- Unclip the cable brackets -arrows- for the Oil Pressure Regulation Valve -N428- -2- from the bottom of the sub-assembly bracket and engine.
- Disconnect the connectors -arrow- for the Oil Pressure Regulation Valve -N428- -2-.



- Disconnect the connectors -bottom arrow- for the Oil Pressure Switch -F1- -3-.
- Disconnect the connectors -top arrow- for the Reduced Oil Pressure Switch -F378- -2-.

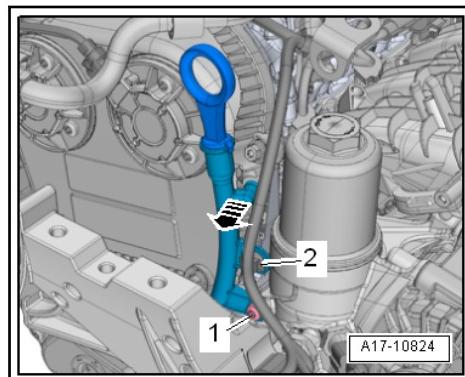


- Remove the oil filter element. Refer to ⇒ Maintenance; Booklet 20.2.

Note

Ignore -2-.

- Remove the bolt -1- for the oil dipstick tube.



Unclip the guide tube from the upper timing chain cover in direction of -arrow-.

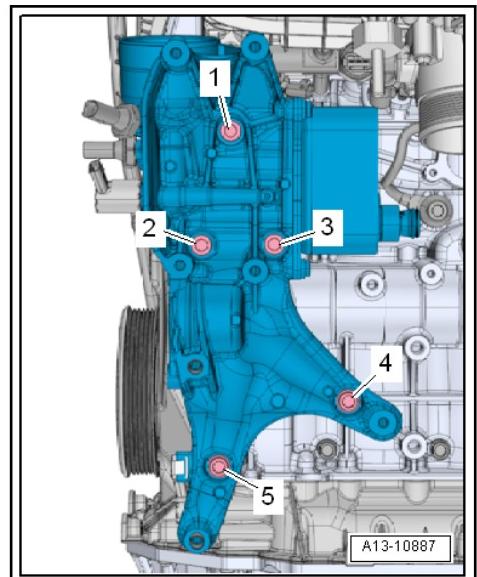
- Free up the wiring harness.
- Place the -VAS6208- under the engine.



Note

The bolts -1 through 5- are various lengths.

- Remove the bolts -1 through 5-. Remove the sub-assembly bracket from the coolant pump housing.



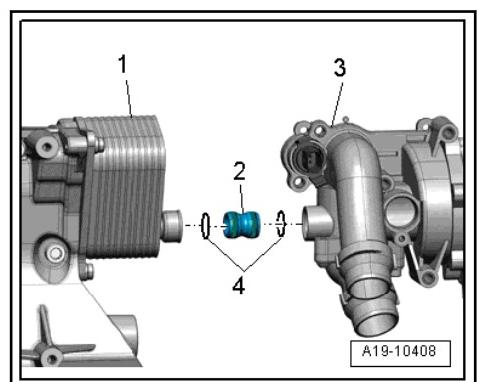
Installing

Install in reverse order of removal and note the following:

Note

Replace the O-rings and seals.

- Coat the new O-rings -4- with coolant. Refer to Parts Catalog for the coolant.



- Insert the connection -2- into the coolant pump housing -3-.
- Slide the sub-assembly bracket -1- onto the connection and then install and tighten the bolts. Refer to [Fig. “Sub-Assembly Bracket - Tightening Specifications and Sequence”](#), page 49 .
- Fill with coolant. Refer to [page 242](#) .
- Install the oil filter and check the oil level. Refer to [Maintenance; Booklet 20.2](#).



Tightening Specifications

- ◆ Refer to [⇒ -1.1 Cylinder Block, Belt Pulley Side”, page 47](#).
- ◆ Refer to [⇒ -2.1 Timing Chain Cover”, page 124](#).
- ◆ Refer to ⇒ Electrical Equipment; Rep. Gr. 27; Generator; Overview - Generator.

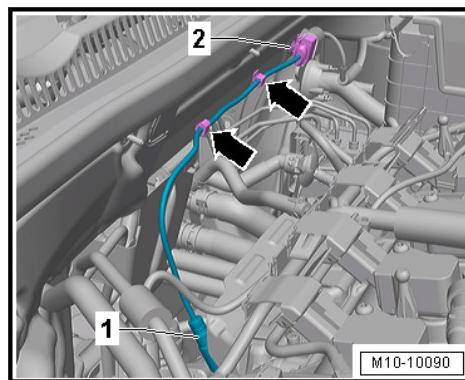
1.6 Engine Support, Removing and Installing

Special tools and workshop equipment required

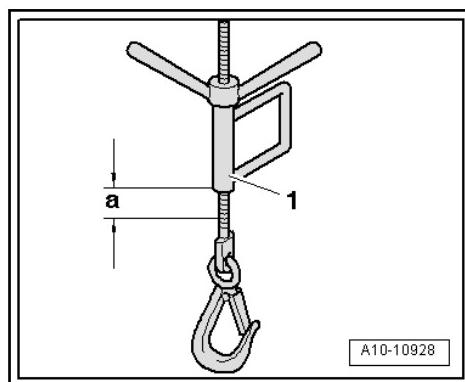
- ◆ Bits for VAG1331/13 -T10099-

Removing

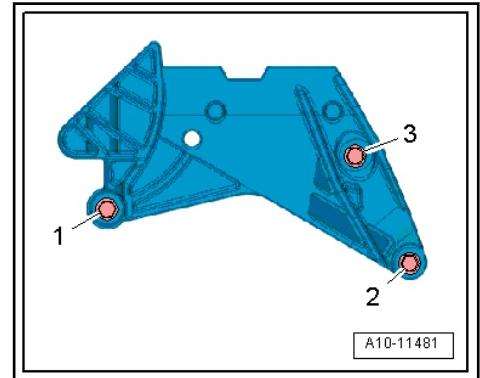
- Disconnect the connector for the Oxygen Sensor 1 before Catalytic Converter -GX10- at the separating point -2-.



- Unclip the cable from the brackets -arrows-.
- Remove the pendulum support. Refer to [⇒ S2.4 upport, Removing and Installing”, page 32](#).
- Remove the engine mount. Refer to [⇒ M2.2 ount, Removing and Installing”, page 29](#).
- Lift the engine using the -10-222A/11- -1- to dimension -a-.



- Dimension -a- = approximately 50 mm.
- Remove the bolts -1, 2 and 3- and engine support.



Installing

Install in reverse order of removal and note the following:

- Install the engine mount. Refer to [M2.2 ount, Removing and Installing](#), page 29 .
- Install the pendulum support. Refer to [S2.4 upport, Removing and Installing](#), page 32 .

Tightening Specifications

- ◆ Refer to [Fig. “Engine Support - Tightening Specification and Sequence”](#), page 28



2 Cylinder Block, Transmission Side

⇒ [-2.1 Cylinder Block, Transmission Side", page 64](#)

⇒ [-2.2 Drive Plate", page 66](#)

⇒ [P2.3 late, Removing and Installing", page 67](#)

⇒ [R2.4 emoving and Installing", page 69](#)

⇒ [F2.5 lange, Removing and Installing, Transmission Side",
page 71](#)

2.1 Overview - Cylinder Block, Transmission Side



1 - Flywheel

- Removing and installing. Refer to [R2.4 removing and Installing](#), page 69 .
- Only possible to install in one position (bores are offset)

2 - Alignment Sleeve

3 - Transmission Side Sealing Flange

- Replace only as a complete unit.
- With seal
- Removing and installing. Refer to [F2.5 lange, Removing and Installing, Transmission Side](#), page 71 .
- Do not oil or grease the sealing lip of seal
- Wipe off any oil on the crankshaft bearing pin with a clean cloth before installing.
- Guide sleeve may only be removed after the sealing flange has been slid onto the crankshaft pin.

4 - Cylinder Block

5 - Bolt

- Tightening specification and sequence. Refer to [Fig. "Transmission Side Sealing Flange - Tightening Specifications and Sequence"](#), page 65 .

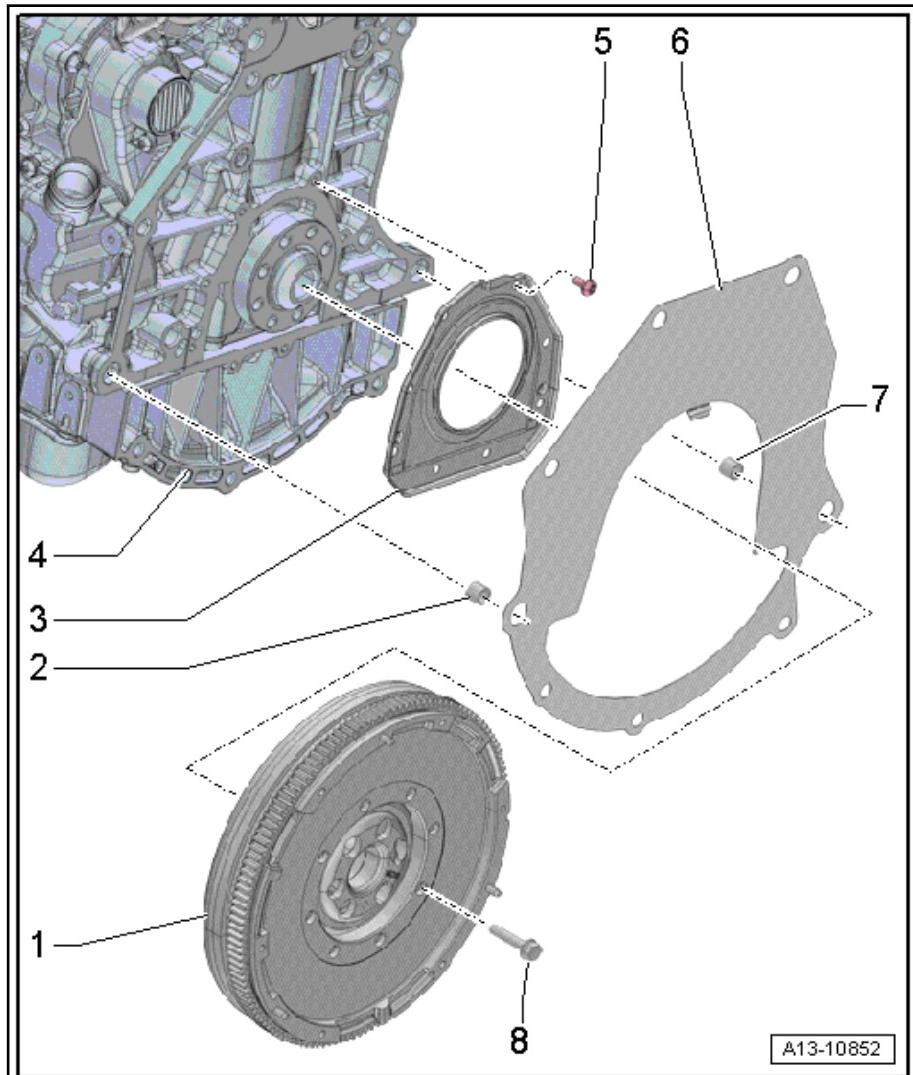
6 - Intermediate Plate

- The illustration does not show the version in the vehicle.
- Must rest on alignment sleeves
- Be careful not to damage or bend when installing
- Engaged at sealing flange. Refer to [Fig. "Intermediate Plate, Installing"](#), page 66

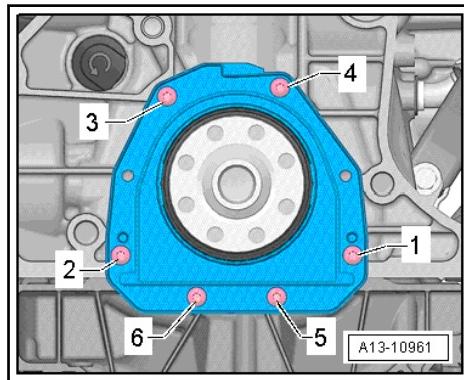
7 - Alignment Sleeve

8 - Bolt

- 60 Nm +90°
- Replace after removing
- For the dual-mass flywheel



Transmission Side Sealing Flange - Tightening Specifications and Sequence



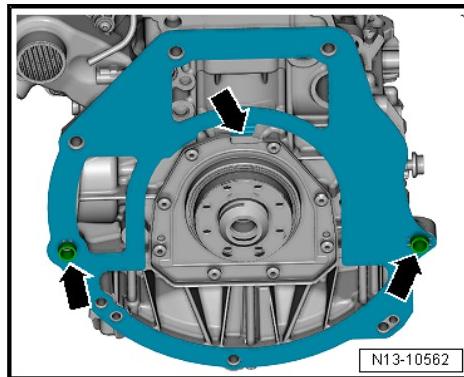
- Tighten the bolts in the shown sequence -1 to 6- in steps:

Step	Bolts	Tightening Specification/Additional Turn
1.	-1 through 6-	Install all the way in by hand.
2.	-1 through 6-	9 Nm



Only six bolts are installed, two bolt openings remain open.

Intermediate Plate, Installing



- Engage the intermediate plate at the sealing flange and push it onto the alignment sleeves -arrows-.

2.2 Overview - Drive Plate

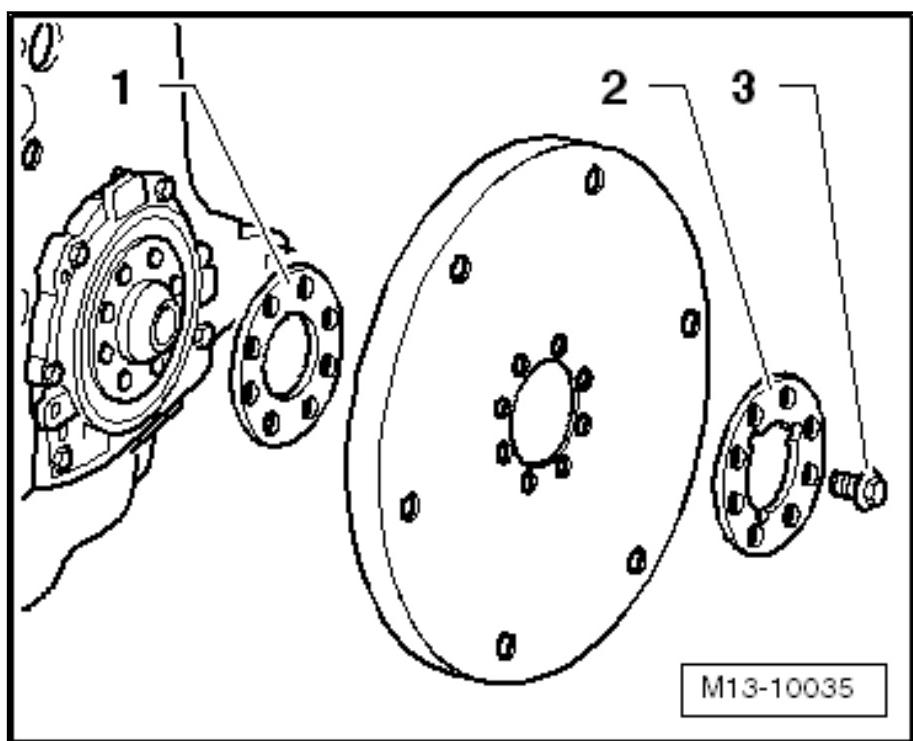


1 - Shim

2 - Washer with Recesses

3 - Bolts

- 60 Nm +90° (additional turning takes place in several stages).
- Replace after removing



- Only attach the drive plate using the washer with openings -2- (without a shim -1-).

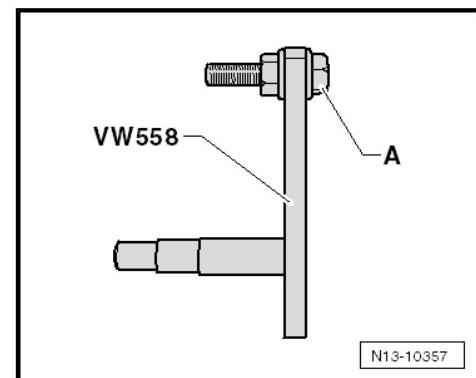
2.3 Drive Plate, Removing and Installing

Special tools and workshop equipment required

- ◆ Flywheel Lock Adapter -VW558-
- ◆ Depth Gauge
- ◆ M8 x 40 hex bolt and M8 hex nut
- Remove the transmission. Refer to => Rep. Gr. 37; Transmission, Removing and Installing.

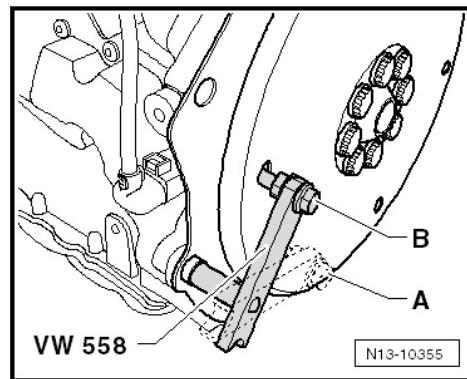
-VW558-, Preparing:

- Tighten the M8x40 hex bolt -A- with a hex nut on the -VW558-.



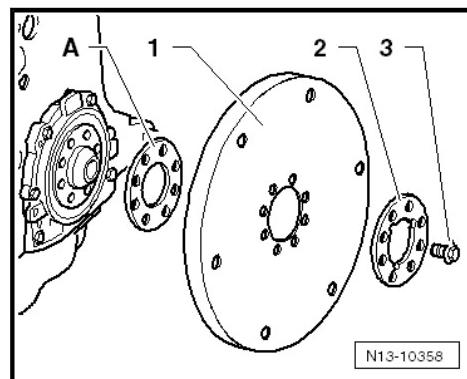
Drive Plate, Loosening and Tightening:

- Insert the -VW558- into the cylinder block and drive plate as shown.

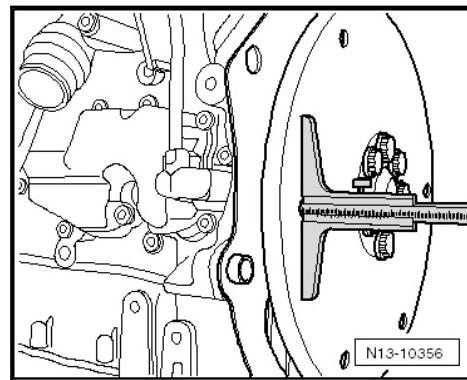


Counterhold tool installation position: -A- to loosen, -B- to tighten.

Drive Plate, Installing:



- First position the drive plate without the washer -A-.
- Insert the used bolts -3- and tighten them to 30 Nm.
- Check the dimension between the drive plate and the cylinder block in three locations and calculate the average.



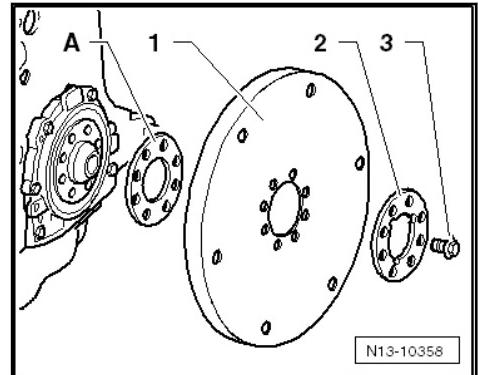
This is measured through the hole in the drive plate to the machined surface of the cylinder block. If measuring on the intermediate plate, then the plate thickness must be taken into account.

- Specified value measured without intermediate plate: 19.5 to 21.1 mm
- Specified value measured with intermediate plate: 18.8 to 20.4 mm



If the specified value is reached, replace all bolts and tighten them.

If the specification is not obtained:



- Remove the drive plate again and use the shim -A-. Tighten the bolts -3- to 30 Nm again.
- Repeat the measurement. If the specified value is reached, replace all bolts and tighten them.

Tightening Specifications

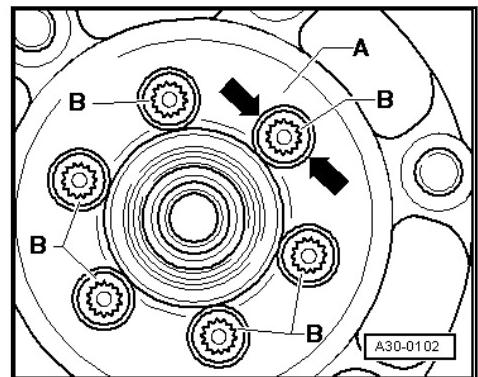
- ◆ Drive plate bolts -item 3- [⇒ Item 3 \(page 67\)](#) .

2.4 Flywheel, Removing and Installing

Special tools and workshop equipment required

- ◆ Flywheel Retainer -3067-

Removing

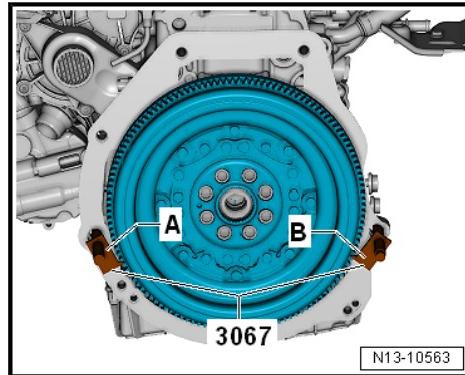


- The transmission is removed.



Note

- ◆ Remove the bolts -B- by hand. Do not use an air-powered or impact wrench.
- ◆ When removing the bolts, make sure that the bolt head does not come in contact with the flywheel.
- ◆ Turn the flywheel -A- so that the bolts -B- line up with the center of the holes -arrows-.
- Place the -3067- into the hole on the cylinder block -B-.



- Loosen and remove bolts for the flywheel.

Installing

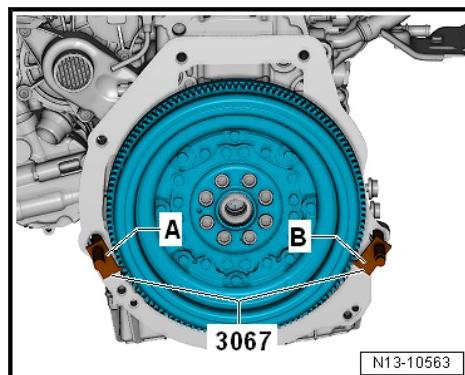
Install in reverse order of removal and note the following:



Note

Bolts that are tightened with an additional turn must be replaced.

- Insert the -3067- into the hole on the cylinder block -A-.



Tightening Specifications

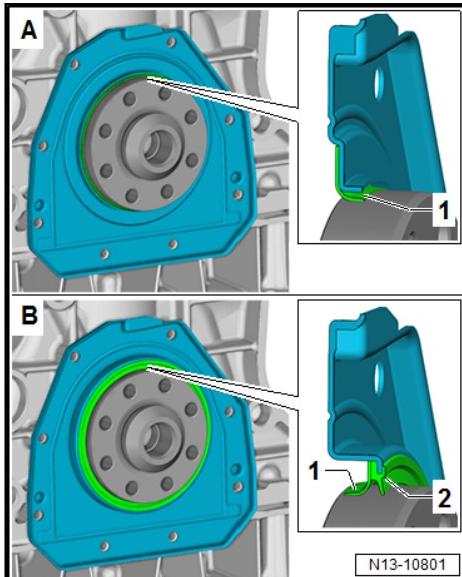
- ◆ Refer to [-2.1 Cylinder Block, Transmission Side”, page 64](#)



2.5 Sealing Flange, Removing and Installing, Transmission Side



There are two versions of the sealing flange. Please check which sealing flange should be installed.



- ◆ *Version -A-: Sealing lip -1- faces the transmission (air side).*
- ◆ *Version -B-: Sealing lip -1- faces the engine (oil side). This sealing flange also has a dust lip -2-.*

Version -A-, Removing and Installing. Refer to [S2.5.1 ide Sealing Flange, Removing and Installing, Version A \(Air Side Sealing Lip\)", page 71](#).

Version -B-, Removing and Installing. Refer to [T2.5.2 rans-mission Side Sealing Flange, Removing and Installing, Version B \(Oil Side Sealing Lip\)" , page 74](#).

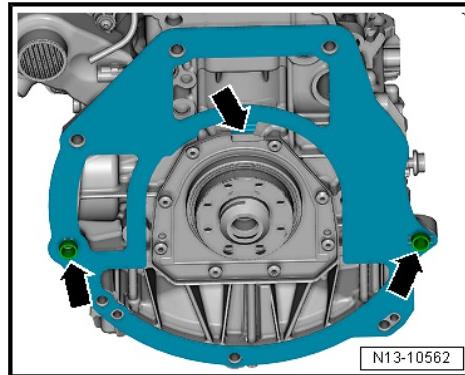
2.5.1 Transmission Side Sealing Flange, Removing and Installing, Version A (Air Side Sealing Lip)

Special tools and workshop equipment required

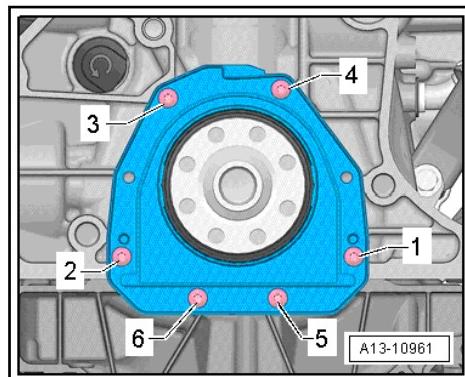
- ◆ Seal Installer - Sealing Flange Guide Sleeve -T20097-
- ◆ Hand Drill with Plastic Brush Attachment
- ◆ Protective Eyewear
- ◆ Refer to the Parts Catalog for the correct sealant.

Removing

- The transmission is removed.
- Remove the flywheel. Refer to [R2.4 emoving and Instal-ling", page 69](#).
- Disengage the intermediate plate at the sealing flange and at the alignment sleeves -arrows-.



- Remove the bolts -1 through 6-.



- Remove the sealing flange.

Installing



Note

- ◆ Be sure to check the expiration date of the silicone sealant.
- ◆ The sealing flange must be installed within five minutes after applying the silicone sealant.
- ◆ To prevent contamination of the lubricating system with sealant residue, place a clean cloth over the open part of the oil pan.

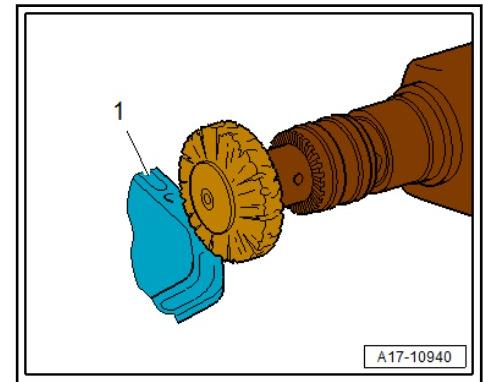


Caution

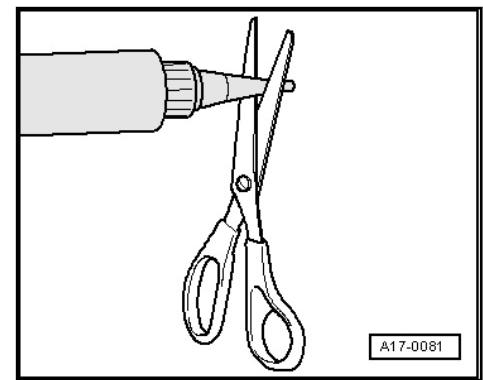
Risk of injuring the eyes from sealant residue.

- Wear protective eyewear.

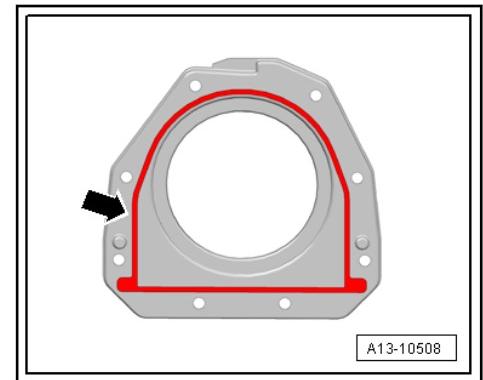
- Remove the sealant residue on the cylinder block with for example a rotating plastic brush.



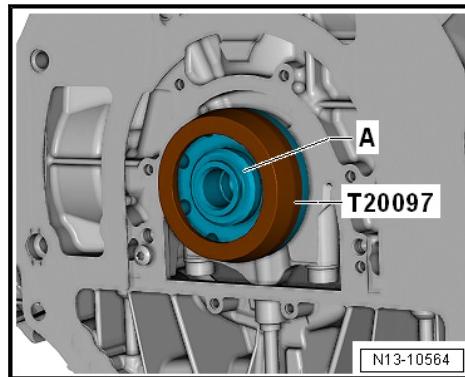
- Clean the sealing surfaces. They must be free of oil and grease.
- Cut the tube nozzle at the front marking (nozzle diameter: approximately 2 mm).



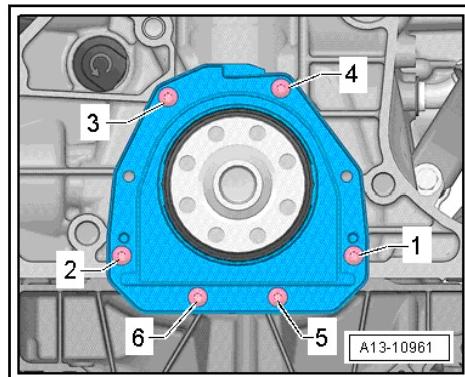
- Apply the silicone sealant on the clean sealing surface of the cover as shown.



- ◆ Sealant bead thickness: 2 to 3 mm.
- Clean the crankshaft journal carefully.



- Position the -T20097- on the crankshaft journal -A-.
- Check the Guide Sleeve; it may be widened or sharp-edged.
- Slide the sealing flange onto the crankshaft pins with the -T20097-.
- Remove the -T20097-.
- Tighten the new bolts in the shown sequence -1 to 6- in steps:



Step	Bolts	Tightening Specification/Additional Turn
1.	-1 through 6-	Install by hand all the way
2.	-1 through 6-	9 Nm



- ◆ Only six bolts are installed, two bolt openings remain open.
◆ After installing the sealing flange, the sealant must dry for approximately 30 minutes. Only afterward may the engine oil be replenished.

Further assembly is performed in the reverse order of the removal.

Tightening Specifications

- ◆ Refer to [-2.1 Cylinder Block, Transmission Side](#), page 64

2.5.2 Transmission Side Sealing Flange, Removing and Installing, Version B (Oil Side Sealing Lip)

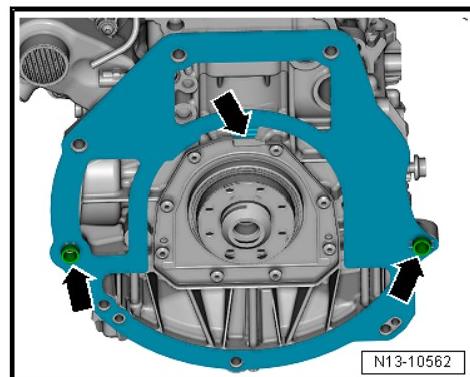
Special tools and workshop equipment required



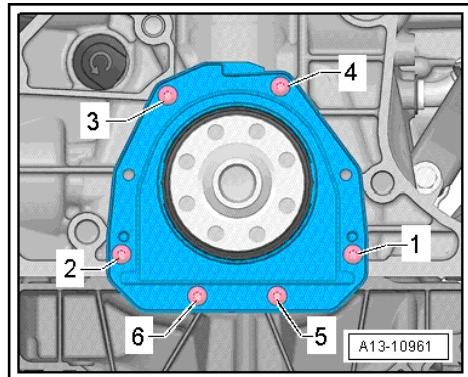
- ◆ Crank Shaft Seal Installer - Guide Piece -T10122/6- or -T10122/6A- from the Seal Installer - Crankshaft -T10122B- or - T10122C-
- ◆ Guide Piece to Crankshaft Seal Install Kit - Guide Piece -T10122/1- from the Seal Installer - Crankshaft -T10122B- or -T10122C-
- ◆ Hand Drill with Plastic Brush Attachment
- ◆ Protective Eyewear
- ◆ Refer to the Parts Catalog for the correct sealant.

Removing

- The transmission is removed.
- Remove the flywheel. Refer to [R2.4 removing and Installing](#), page 69 .
- Disengage the intermediate plate at the sealing flange and at the alignment sleeves -arrows-.



- Remove the bolts -1 through 6-.



- Remove the sealing flange.

Installing

Note

- ◆ Be sure to check the expiration date of the silicone sealant.
- ◆ The sealing flange must be installed within five minutes of applying the silicone sealant.
- ◆ To prevent contamination of the lubricating system with sealant residue, place a clean cloth over the open part of the oil pan.

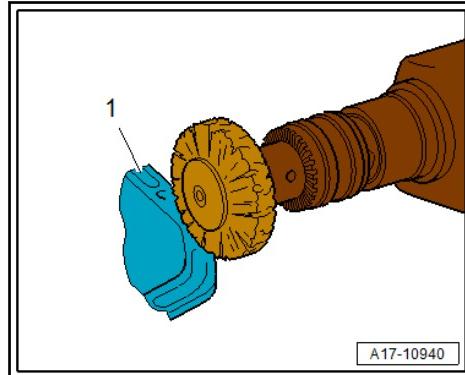


Caution

Risk of injuring the eyes from sealant residue.

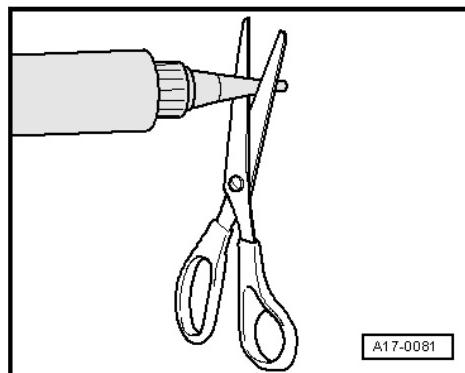
- *Wear protective eyewear.*

- Remove the sealant residue on the cylinder block with for example a rotating plastic brush.



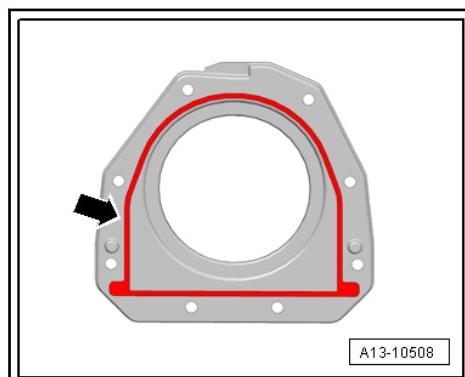
A17-10940

- Clean the sealing surfaces. They must be free of oil and grease.
- Clean the crankshaft journal. Only when there is rust on the crankshaft journal coat thinly with engine oil.
- Cut the tube nozzle at the front marking (nozzle diameter: approximately 2 mm).



A17-0081

- Apply silicone grease as shown to the clean sealing surface of the sealing flange.

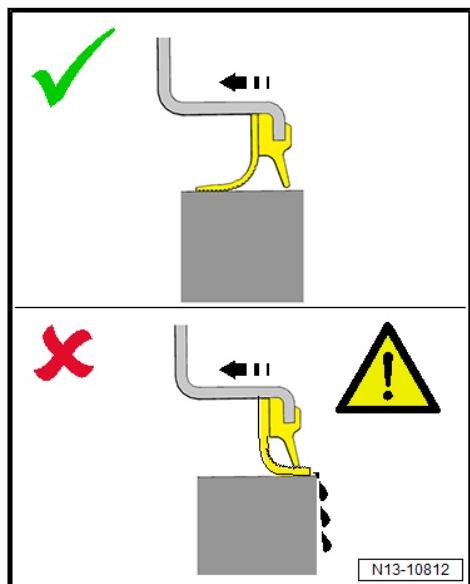


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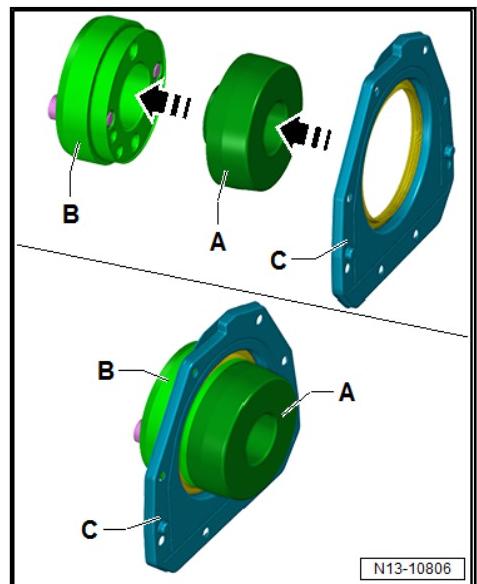
- ◆ Sealant bead thickness: 2 to 3 mm.

**Note**

- ◆ The sealing flange must be installed within five minutes after applying the silicone sealant.
- ◆ The sealant bead may not be thicker than specified, otherwise excess sealant could enter the oil pan and clog the oil intake pipe screen.
- ◆ Check the sealing lip of the sealing flange, it must not be kinked or damaged.
- ◆ The sealing lip must be pointed to the engine after installing. If the sealing lip »folds« outward when installing, leaks will result.



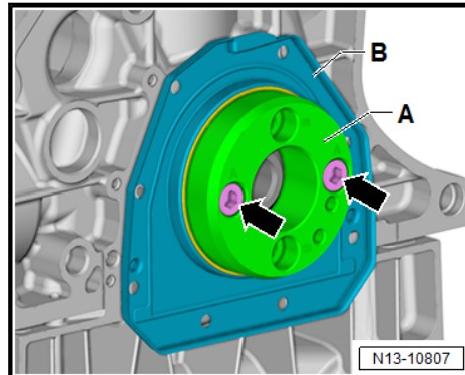
- Check the -T10122/6- -B-; it must not be tilted or contaminated.



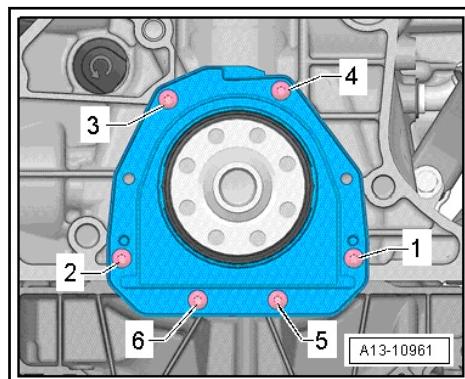
- Mount the -T10122/1- -A- on the -T10122/6- -B-.
- Slide the sealing flange -C- with the outer side first on the -T10122/6- -B-.



- Remove the -T10122/1- -A-.
- Insert the -T10122/6- -A- with the sealing flange -B- on the crankshaft journal.



- Tightening the bolts -arrows- is not necessary.
- Slide the Sealing Flange -B- over the -T10122/6- -A- on the crankshaft journal.
- Remove the -T10122/6- -A-.
- Tighten the new bolts evenly in the sequence shown:



Step	Bolts	Tightening Specification/Additional Turn
1.	-1 through 6-	Install by hand all the way
2.	-1 through 6-	9 Nm

Note

- ◆ Only six bolts are installed, two bolt openings remain open.
- ◆ After installing the sealing flange, the sealant must dry for approximately 30 minutes. Only afterward may the engine oil be replenished.

Further assembly is performed in the reverse order of the removal.

Tightening Specifications

- ◆ Refer to [-2.1 Cylinder Block, Transmission Side](#), page 64



3 Crankshaft

- [⇒ -3.1 Crankshaft", page 79](#)
- [⇒ D3.2 imensions", page 81](#)
- [⇒ B3.3 earing Shells Allocation", page 82](#)
- [⇒ N3.4 eedle Bearing, Replacing", page 83](#)
- [⇒ M3.5 easuring Axial Clearance", page 85](#)
- [⇒ M3.6 easuring Radial Clearance", page 86](#)
- [⇒ W3.7 heel, Removing and Installing", page 87](#)

3.1 Overview - Crankshaft



Note

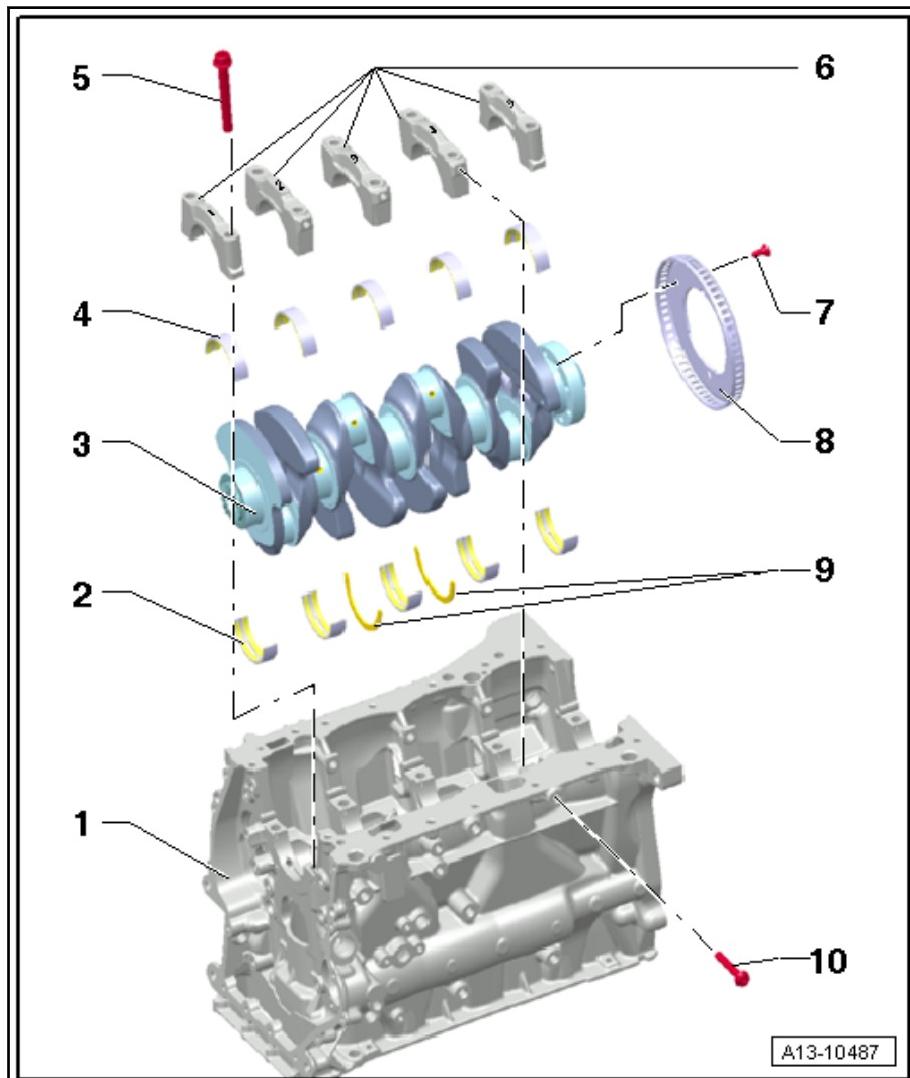
The engine must be secured to the assembly stand with the - VAS6095A- when performing repair work. Refer to ⇒ S1.3 ecurring to Engine and Transmission Holder", page 20 .

**1 - Cylinder Block****2 - Cylinder Block Bearing Shell**

- With oil groove
- Lubricate
- Do not interchange used bearing shells (mark them)
- Crankshaft bearing shells identification (classification). Refer to [B3.3 earing Shells Allocation](#), page 82 .

3 - Crankshaft

- After removing, set it aside so that the sensor wheel -item 8- [Item 8 \(page 80\)](#) is not rested on and becomes damaged
- If the crankshaft is being replaced, then the bearing shells must be reallocated to the bearing cap. Refer to [B3.3 earing Shells Allocation](#), page 82 .
- Axial Clearance. Refer to [M3.5 easuring Axial Clearance](#), page 85
- Radial Clearance. Refer to [M3.6 easuring Radial Clearance](#), page 86 .
- Do not turn the crankshaft when measuring radial clearance
- Crankshaft Dimensions. Refer to [D3.2 imensions](#), page 81 .

**4 - Bearing Shell for Bearing Cap**

- Without oil groove
- Lubricate
- Do not interchange used bearing shells (mark them)
- Crankshaft bearing shells identification (classification). Refer to [B3.3 earing Shells Allocation](#), page 82 .

5 - Bolt

- Replace after removing
- Refer to [Fig. "Crankshaft - Tightening Sequence"](#), page 81

6 - Bearing Cap

- Bearing cap 1: belt pulley side
- Retaining tabs for cylinder block/bearing cap bearing shells must lie above one another

7 - Bolt

- 10 Nm +90°
- Replace after removing
- Replace the sensor wheel every time the bolts are loosened. Refer to [W3.7 heel, Removing and Installing](#), page 87 .

8 - Sensor Wheel



- For Engine Speed Sensor -G28-
- Only possible to install in one position (bores are offset)
- Replace the sensor wheel every time the bolts are loosened
- Removing and installing. Refer to [W3.7 heel, Removing and Installing](#), page 87 .

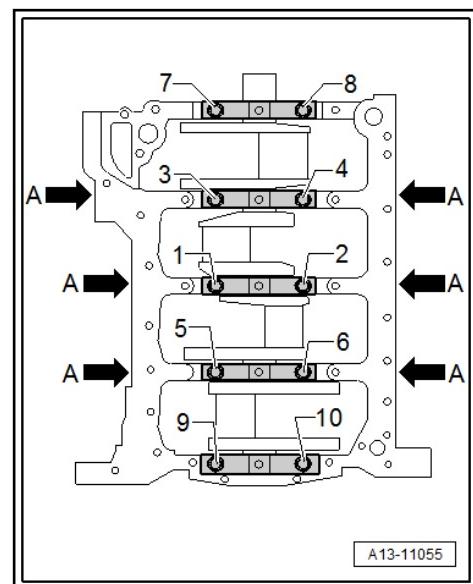
9 - Thrust Washers

- For bearing 3
- Lubricate

10 - Bolt

- Replace after removing
- Refer to [Fig. “Crankshaft - Tightening Sequence”](#), page 81

Crankshaft - Tightening Sequence



- Tighten the crankshaft bolts in the sequence -1 through 10- and -A arrows- as follows.

Step	Bolts	Tightening Specification/Additional Turn
1.	-1 through 10- and -A arrows-	Install hand-tight
2.	-1 through 10-	65 Nm
3.	-1 through 10-	Turn an additional 90°.
4.	-A arrows-	20 Nm
5.	-A arrows-	Turn an additional 90°.

3.2 Crankshaft Dimensions

(Dimensions in mm)

Reconditioning Dimension 1)	Crankshaft Bearing Pin Diameter	Connecting Rod Bearing Pin Diameter
Standard dimension	58.00	47.80

¹⁾ The preparation of worn crankshafts is not possible at this time.



3.3 Main Bearing Shells Allocation

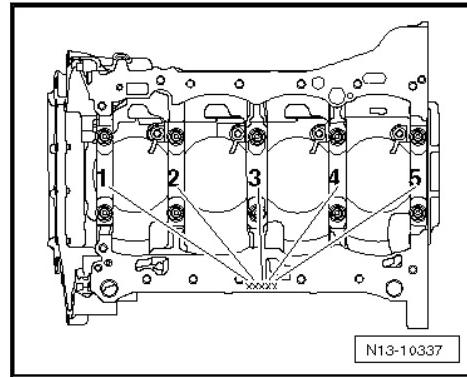
The bearing shells are allocated to the cylinder block with the correct thickness at the factory. Colored dots are used to identify the bearing shell thickness.

The letters on the lower sealing surface or on the front side of the cylinder block indicate which bearing shell must be inserted at which position in the cylinder block (upper bearing shell).

The letters on the crankshaft indicate which bearing shell must be inserted at which position in the bearing cap (lower bearing shell).

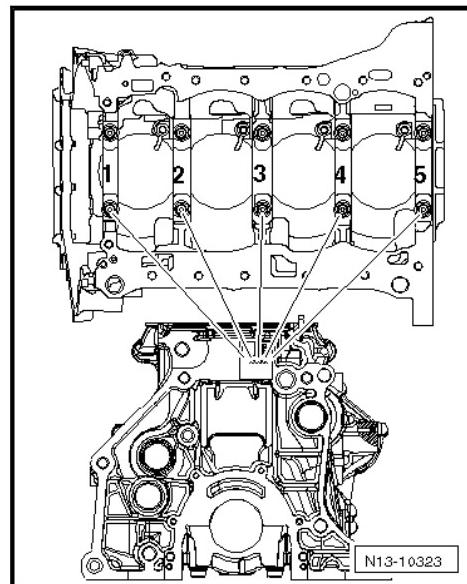
The first letter is for bearing cap one, the second for bearing cap two, etc.

Cylinder Block Bearing Shell Identification



The cylinder block identification may be engraved either on the oil pan sealing surface or on the front side (transmission side) of the cylinder block.

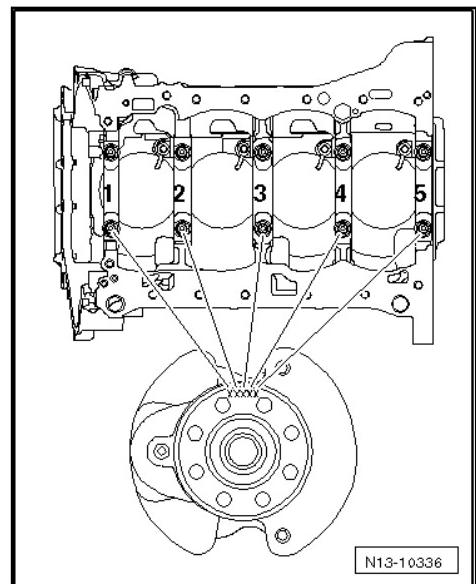
The identification on the cylinder block is for the upper bearing shell (cylinder block bearing shell).



- Write down the letters and then use the table to find the color identification.



Bearing Cap Bearing Shell Identification



The identification on the crankshaft is for the lower bearing shell (bearing cap bearing shell)

- Write down the letters and then use the table to find the color identification.

S	=	Black
R	=	Red
G	=	Yellow
B	=	Blue
W	=	White

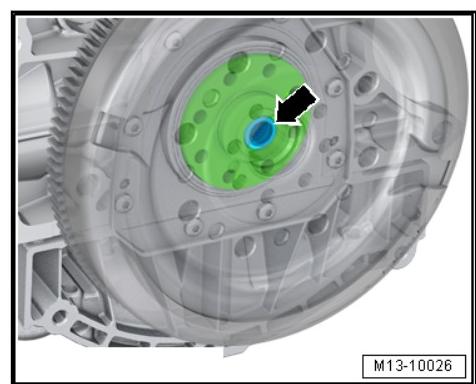
3.4 Crankshaft Needle Bearing, Replacing

Special tools and workshop equipment required

- ◆ Counter-support, for example Puller - Kukko Counterstay -22/1-
- ◆ Internal puller, for example Puller - Kukko Internal - 14-19mm -21/2-
- ◆ Bearing Installer - Bearing Press Piece -VW207C-

Only for Vehicles Equipped with a DSG® Transmission

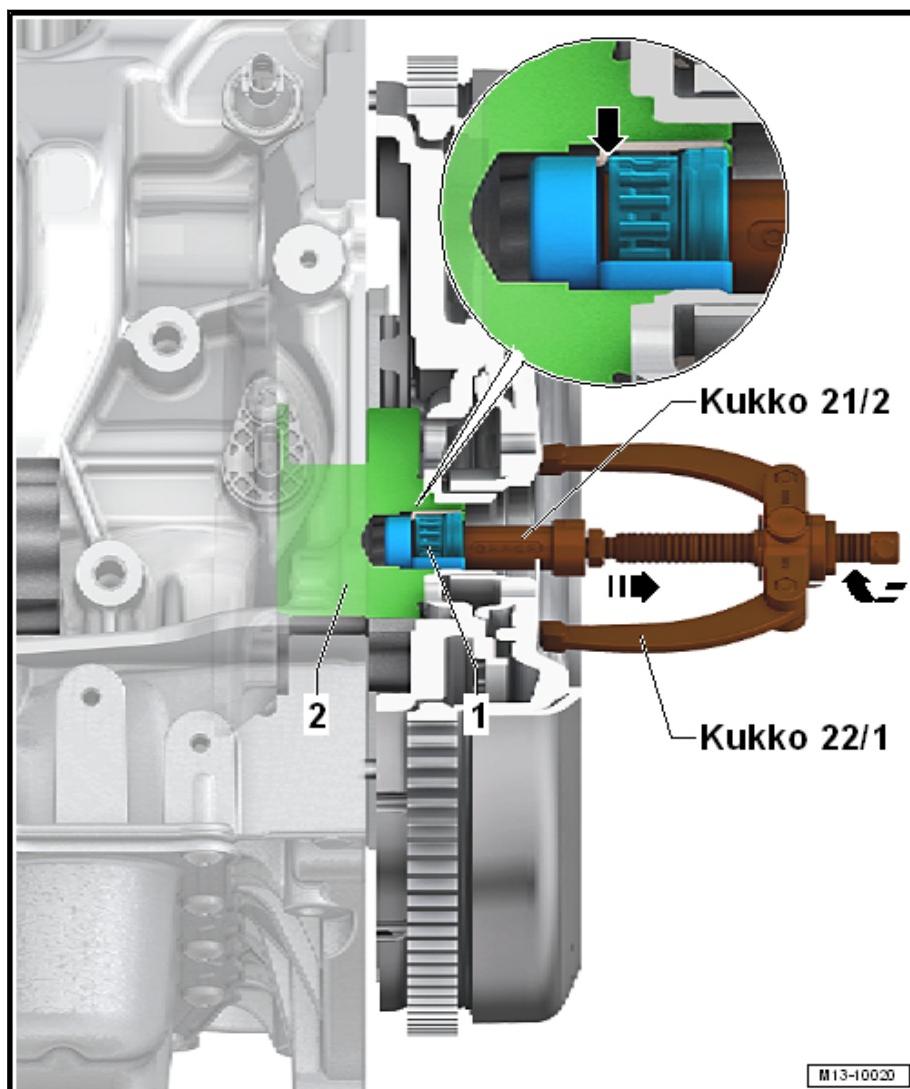
Conditions:



- The front edges of the internal puller must not be broken off.



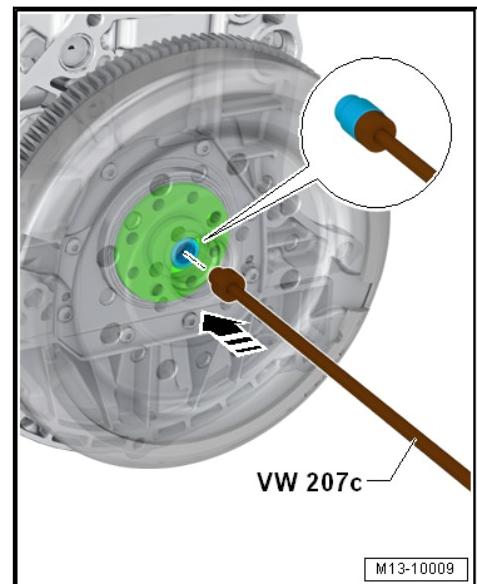
Needle Bearing, Removing



- Remove the needle bearing -1- from the crankshaft -2- using a commercially available internal puller, for example -21/2-, and a counter-support, for example -22/1-.
- The internal puller must be positioned behind the needle rim in direction of -arrow-.

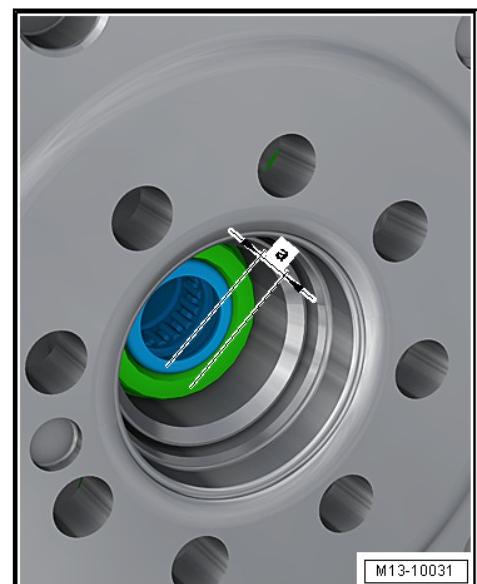


Installing



- Clean the bearing seat in the crankshaft and apply a thin coat of grease.
- Drive the needle bearing into the crankshaft using the - VW207C-.

Installation Depth: Dimension -a- = 2.0 mm.



Note

If the needle bearing was unintentionally driven in too deeply, it must be replaced, because it will be damaged when it is removed again.

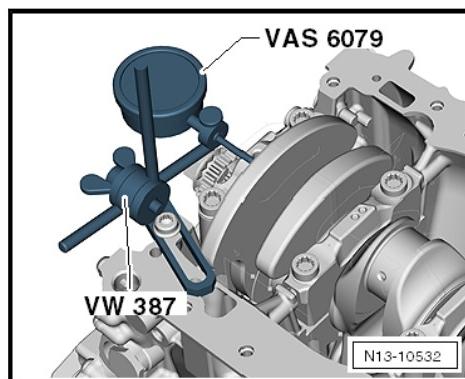
3.5 Crankshaft, Measuring Axial Clearance

Special tools and workshop equipment required

- ◆ Dial Gauge Holder -VW387-
- ◆ Dial Gauge - 0-10mm -VAS6079-



Procedure



- Attach the -VAS6079- with the -VW387- to the cylinder block and with approximately 2 mm pretension, set it against the crankshaft counterweight.
- Push the crankshaft against the dial gauge by hand and set the dial gauge to "0".
- Remove the crankshaft from the dial gauge and read the measurement.

Axial clearance:

- New: 0.070 to 0.23 mm.
- Wear limit: 0.30 mm.

3.6 Crankshaft, Measuring Radial Clearance

Special tools and workshop equipment required

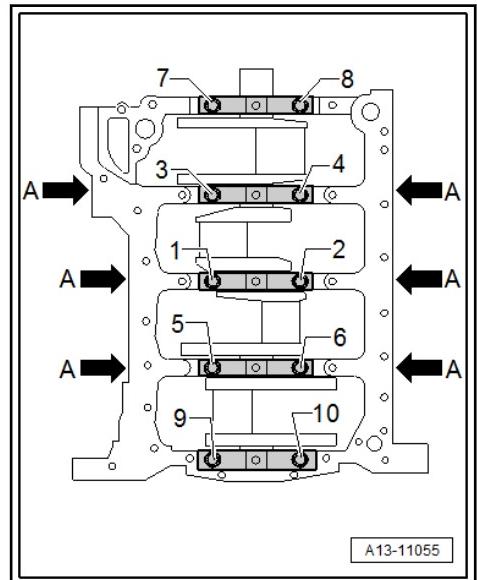
- ◆ Plastigauge®

Procedure

Note

- ◆ *Do not interchange used bearings*
- ◆ *Bearing shells that are worn down to the nickel layer must be replaced.*

- Remove the crankshaft bearing cap and clean the bearing cap and pin.
- Place the Plastigauge® over the entire bearing width on the pin or in the bearing shells.
- Plastigauge® must rest in the center of the bearing shell.
- Position the crankshaft bearing cap and tighten with the old bolts -1 to 10-. Refer to [Fig. “Crankshaft - Tightening Sequence”, page 81](#). Do not turn the crankshaft while doing so.



Note

Ignore the bolts -A arrows-.

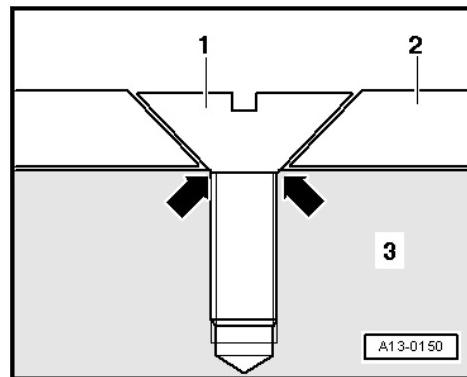
- Remove the crankshaft bearing cap again.
- Compare the width of Plastigauge® with the measuring scale.

Radial clearance:

- New: 0.017 to 0.037 mm.
- Wear limit: 0.15 mm.

3.7 Sensor Wheel, Removing and Installing

- Remove the engine.
- Remove the transmission side sealing flange. Refer to [F2.5 lange, Removing and Installing, Transmission Side](#), page 71 .
- Remove the oil pan upper section. Refer to [P1.4 an Upper Section, Removing and Installing](#), page 211 .
- Remove the balance shaft timing chain. Refer to [S3.4 haft Drive Chain, Removing and Installing](#), page 160 .
- Remove the connecting rod bearing cap.
- Remove the crankshaft bearing cap.
- Remove the crankshaft and the sensor wheel.
- Replace the sensor wheel -2- each time the bolts -1- are loosened.



 Note

- ◆ After tightening a second time, the attachment point of the countersunk bolts in the sensor wheel is so deformed that the bolt heads are at the crankshaft -3- -arrows- and the sensor wheel is loose under the bolts.
- ◆ Installing the sensor wheel is only possible in one position - the bores are offset.

Tightening Specifications

- ◆ Refer to [=> -3.1 Crankshaft", page 79](#)



4 Balance Shaft

[⇒ 4.1 Balance Shaft", page 89](#)

[⇒ S4.2 haft, Removing and Installing", page 90](#)

[⇒ S4.3 haft Sealing Ring, Replacing, Intake Side", page 95](#)

4.1 Overview - Balance Shaft

1 - Bolt

- 4 Nm + 45° additional turn
- Replace after removing

2 - Balance Shaft

- Must be replaced after removing
- Exhaust side
- Lubricate the bearing with engine oil
- Replacing. Refer to [⇒ S4.2 haft, Removing and Installing, Exhaust Side", page 93](#).

3 - Needle Bearing Rim

- Replace each time the balance shaft is removed
- No replacement part; part of the balance shaft delivery package

4 - Balance Shaft Pipe

- Installation position. Refer to [⇒ Fig. "Balance Shaft Pipe Installation Position", page 90](#)

5 - Cylinder Block

6 - Intake Side Balance Shaft Seal

- Replacing. Refer to [⇒ S4.3 haft Sealing Ring, Replacing, Intake Side", page 95](#).

7 - Balance Shaft

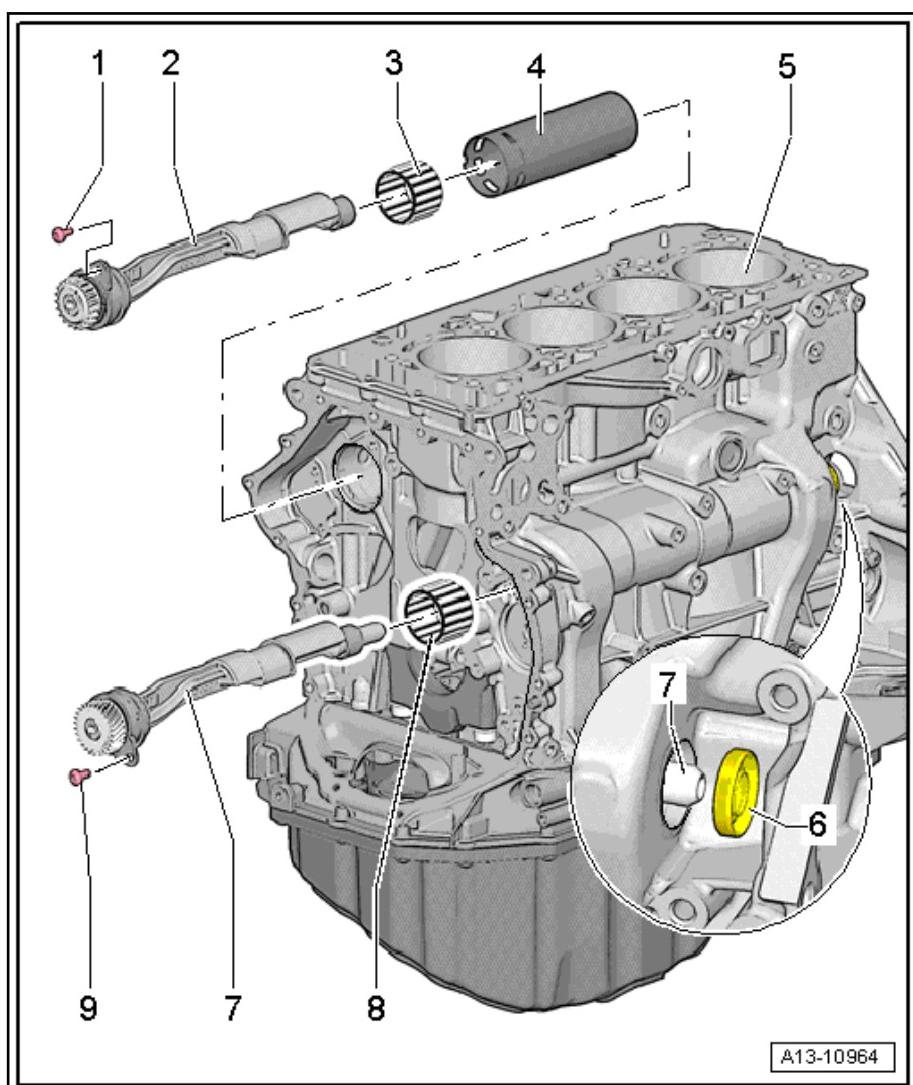
- Must be replaced after removing
- Intake side
- Lubricate the bearing with engine oil
- Replacing. Refer to [⇒ S4.2.1 haft, Removing and Installing, Intake Side", page 90](#).

8 - Needle Bearing Rim

- No replacement part; part of the balance shaft delivery package

9 - Bolt

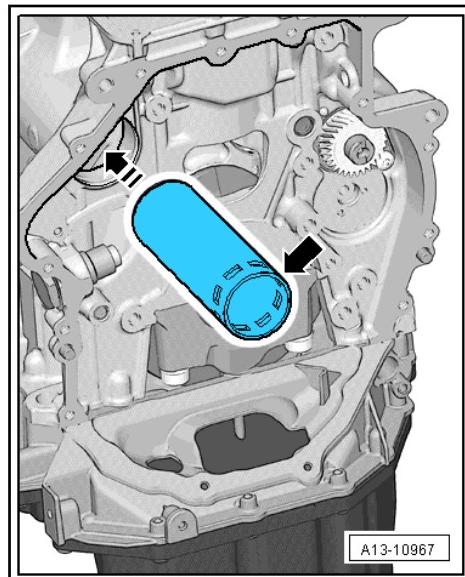
- Replace after removing
- 4 Nm + 45° additional turn



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Balance Shaft Pipe Installation Position



- The openings -arrow- must face the chain side.

4.2 Balance Shaft, Removing and Installing

⇒ [S4.2.1 haft, Removing and Installing, Intake Side", page 90](#)

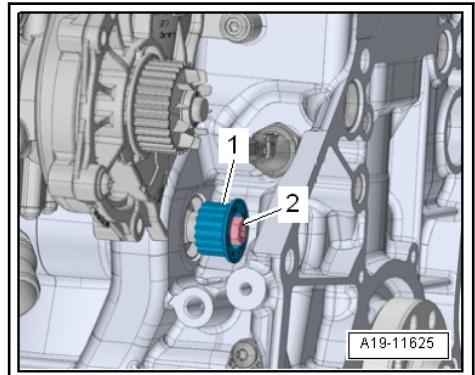
⇒ [S4.2.2 haft, Removing and Installing, Exhaust Side", page 93](#)

4.2.1 Balance Shaft, Removing and Installing, Intake Side

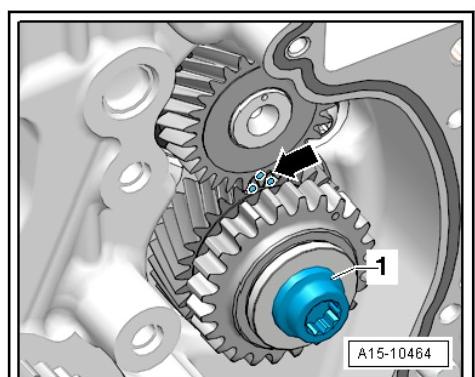
The balance shaft and needle bearing must be replaced after every removal. Install a new needle bearing with the same color identification.

Removing

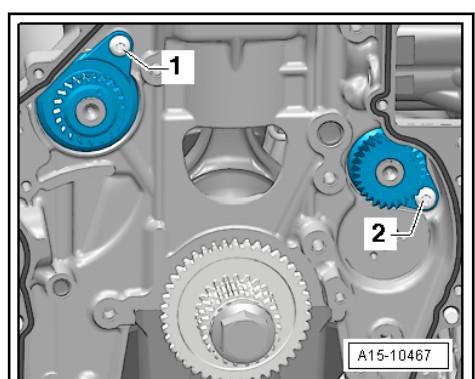
- Engine removed.
- Remove the coolant pump toothed belt. Refer to ⇒ [P2.6 upp Toothed Belt, Removing and Installing", page 256](#).
- Remove the upper timing chain cover. Refer to ⇒ [T2.2.1 iming Chain Cover, Removing and Installing", page 127](#).
- Remove the lower timing chain cover. Refer to ⇒ [T2.2.2 iming Chain Cover, Removing and Installing", page 129](#).
- Remove the camshaft timing chain. Refer to ⇒ [T3.3 iming Chain, Removing and Installing", page 145](#).
- Remove the balance shaft drive chain. Refer to ⇒ [S3.4 haft Drive Chain, Removing and Installing", page 160](#).
- Remove the bolt -2-.



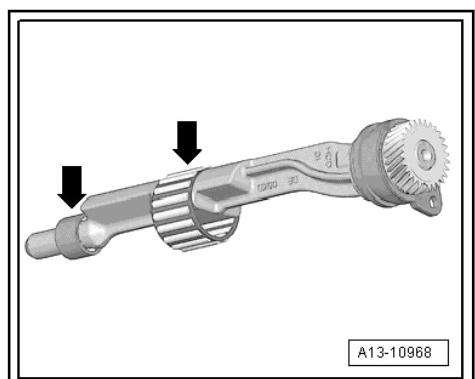
- Remove the drive wheel -1- for the coolant pump toothed belt.
- Remove the intermediate shaft sprocket -1-.



- Remove the bolt -2- for the intake side balance shaft and remove the balance shaft.

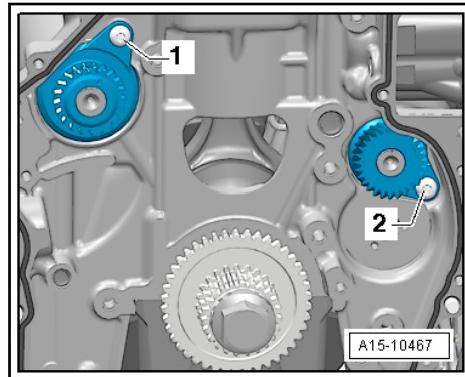


Installing

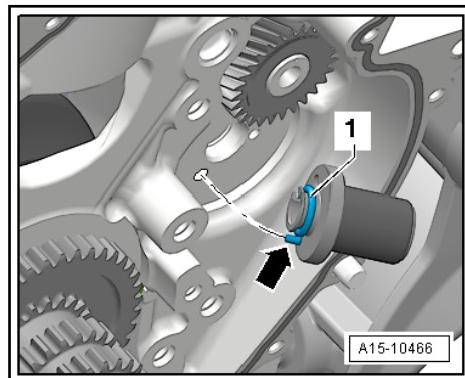




- Lubricate the balance shaft mountings -arrows- with engine oil.
- Install the intake side balance shaft and tighten the bolt -2-.



- Replace the O-ring -1- and coat with engine oil.

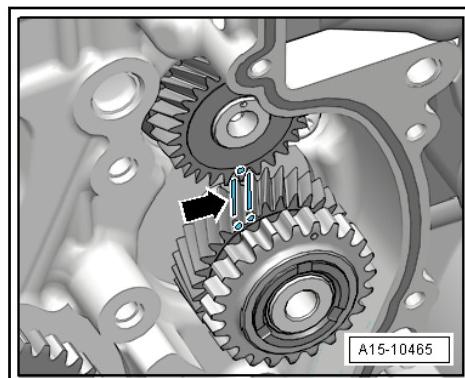


- Coat the mounting pin with engine oil and insert it. The alignment pin -arrow- for the mounting pin must engage in the cylinder block hole.

 **Note**

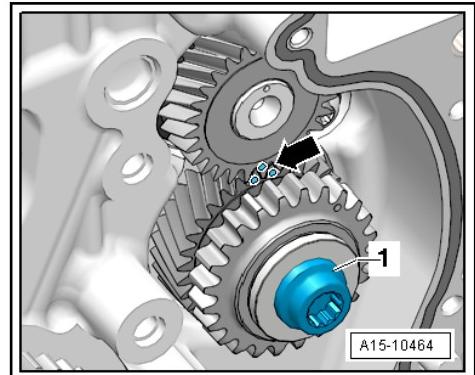
- ◆ Always replace the intermediate sprocket. Otherwise the backlash will not adjust itself and it could cause damage to the engine.
- ◆ The new intermediate sprocket has an anti-friction coating that wears off after a short period of use, which automatically adjusts the backlash.

- Mark the tooth flank on the intermediate sprocket -arrow-.





- Install the intermediate sprocket; the marking on the balance shaft must be between the markings on the tooth flanks.
- Tighten the bolt -1- for the intermediate sprocket: tightening sequence. Refer to [Fig. "Intermediate Sprocket Tightening Sequence"](#), page 144 .



- Check the markings on the intermediate sprocket/balance shaft -arrow-.

Further assembly is performed in the reverse order of the removal. Note the following:

- Install the balance shaft drive chain. Refer to [S3.4 haft Drive Chain, Removing and Installing](#), page 160 .
- Install the camshaft timing chain. Refer to [T3.3 iming Chain, Removing and Installing](#), page 145 .
- Install the lower timing chain cover. Refer to [T2.2.2 iming Chain Cover, Removing and Installing](#), page 129 .
- Install the upper timing chain cover. Refer to [T2.2.1 iming Chain Cover, Removing and Installing](#), page 127 .
- Replace the intake side balance shaft seal. Refer to [S4.3 haft Sealing Ring, Replacing, Intake Side](#), page 95 .
- Install the toothed belt on the coolant pump. Refer to [P2.6 ump Toothed Belt, Removing and Installing](#), page 256 .

Tightening Specifications

- ◆ Refer to [-4.1 Balance Shaft](#), page 89

4.2.2 Balance Shaft, Removing and Installing, Exhaust Side

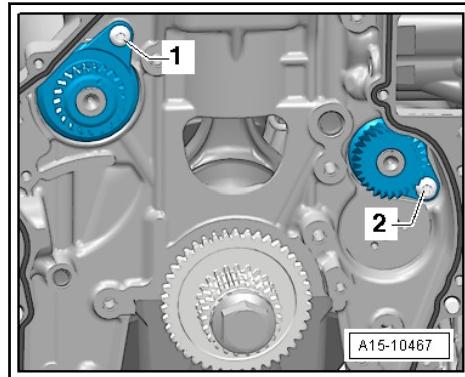
The balance shaft and needle bearing must be replaced after every removal. Install a new needle bearing with the same color identification.

Removing

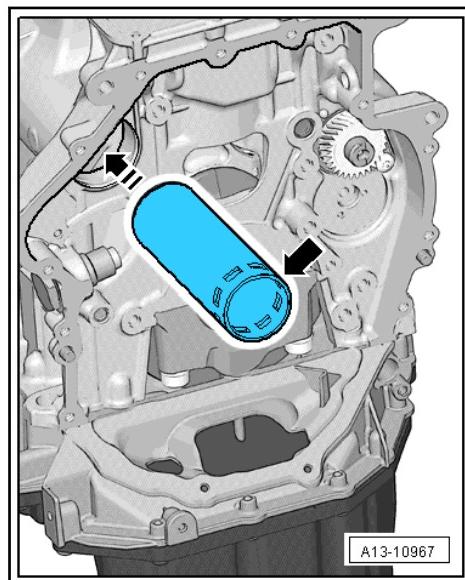
- Engine removed.
- Remove the upper timing chain cover. Refer to [T2.2.1 iming Chain Cover, Removing and Installing](#), page 127 .
- Remove the lower timing chain cover. Refer to [T2.2.2 iming Chain Cover, Removing and Installing](#), page 129 .
- Remove the camshaft timing chain. Refer to [T3.3 iming Chain, Removing and Installing](#), page 145 .



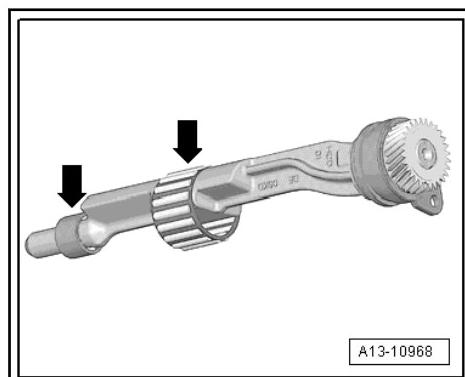
- Remove the balance shaft drive chain. Refer to [S3.4 haft Drive Chain, Removing and Installing](#), page 160 .
- Remove the bolt -1- for the exhaust side balance shaft and remove the balance shaft.



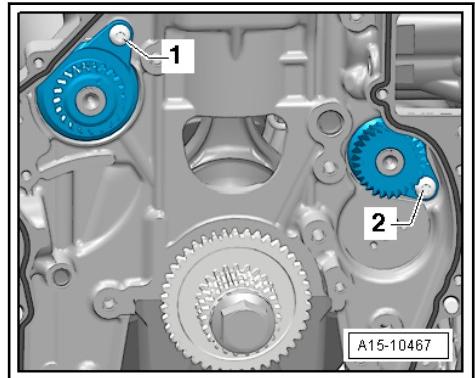
Installing



- Check the installed position for the balance shaft pipe. The openings -arrow- must face the chain side.
- Lubricate the balance shaft mountings -arrows- with engine oil.



- Install the exhaust side balance shaft.



- Before tightening the bolt -1- make sure the balance shaft lies level on the crankcase.



Note

If the balance shaft is not level, then the pipe for the balance shaft must be installed again.

Further assembly is performed in the reverse order of the removal. Note the following:

- Install the balance shaft drive chain. Refer to [S3.4 haft Drive Chain, Removing and Installing](#), page 160 .
- Install the camshaft timing chain. Refer to [T3.3 iming Chain, Removing and Installing](#), page 145 .
- Install the lower timing chain cover. Refer to [T2.2.2 iming Chain Cover, Removing and Installing](#), page 129 .
- Install the upper timing chain cover. Refer to [T2.2.1 iming Chain Cover, Removing and Installing](#), page 127 .

Tightening Specifications

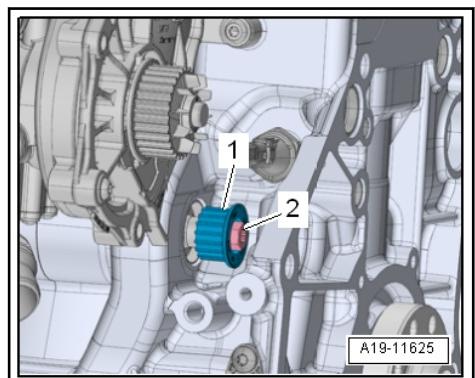
- ◆ Refer to [-4.1 Balance Shaft](#), page 89

4.3 Balance Shaft Sealing Ring, Replacing, Intake Side

Special tools and workshop equipment required

- ◆ Seal Installer, Intermediate Shaft -T10356/1-

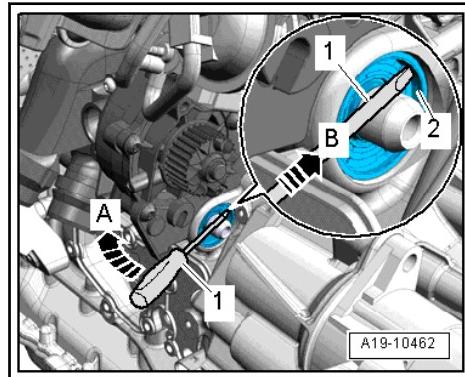
Procedure



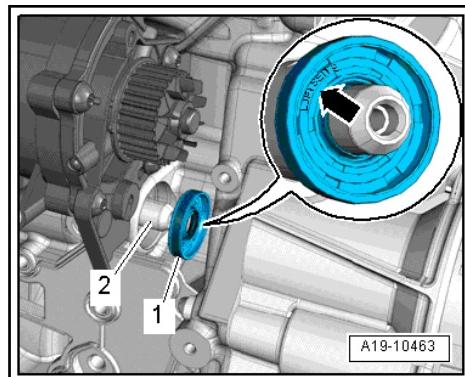
- Remove the coolant pump toothed belt. Refer to [P2.6 ump Toothed Belt, Removing and Installing](#), page 256 .
- Remove the bolt -2-.



- Remove the drive wheel -1- for the coolant pump toothed belt.
- Firmly press a screwdriver -1- on the seal surface -2- in direction of -arrow B-.



- Pry out the seal in direction of -arrow A-.
- Clean the contact and sealing surface.
- Coat the sealing surface of the balance shaft -2- with transmission oil.

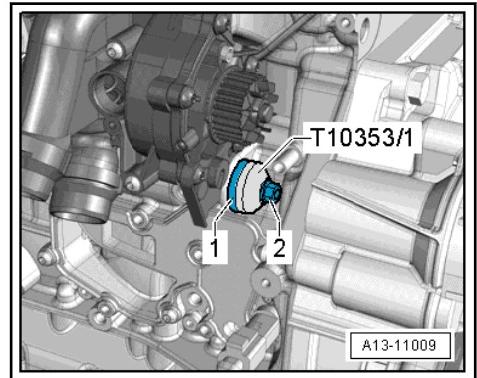


- Push the shaft seal -1- onto the balance shaft.
- “Luftseite” or (“Outside”) -arrow- must be readable from the outside.

 Note

The bolt for the drive wheel -2- has left-hand thread.

- Mount the -T10353/1- on the shaft seal -1- and then press it all the way into the cylinder block with the bolt -2-. While doing so, do not tilt the shaft seal.



- Install the toothed belt on the coolant pump. Refer to [P2.6 Pump Toothed Belt, Removing and Installing](#), page [256](#).
- Fill with coolant. Refer to [page 242](#).



5 Piston and Connecting Rod

- ⇒ [-5.1 Piston and Connecting Rod", page 98](#)
- ⇒ [R5.2 emoving and Installing", page 100](#)
- ⇒ [a5.3 nd Cylinder Bore, Checking", page 101](#)
- ⇒ [C5.4 onnecting Rod, Separating", page 103](#)
- ⇒ [R5.5 ods, Checking Radial Clearance", page 104](#)

5.1 Overview - Piston and Connecting Rod



1 - Connecting Rod Bolts

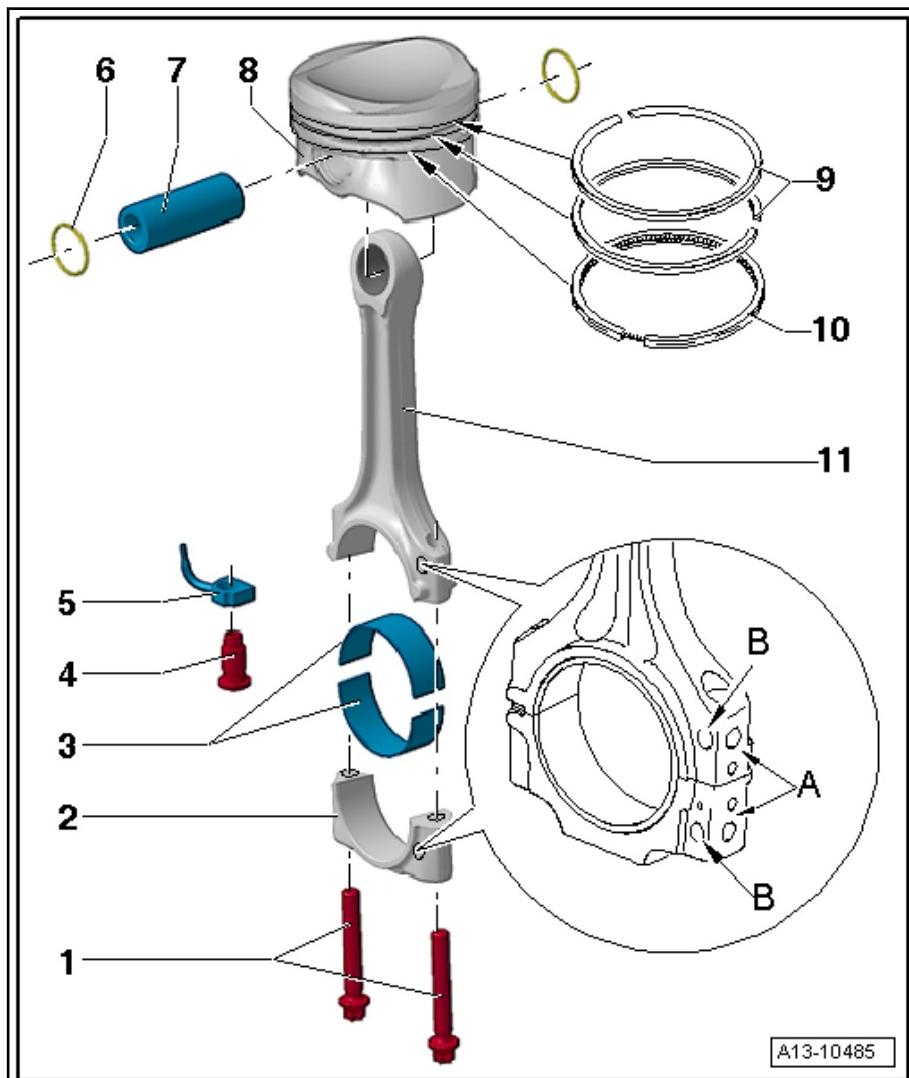
- 45 Nm +90°
- Replace after removing
- Lubricate the thread and contact surface.
- Use the old bolt to measure the radial clearance

2 - Connecting Rod Bearing Cap

- Note the installation position
- Due to the separation procedure (cracking) of the connecting rod, the connecting rod bearing cap only fits in one position and only to the corresponding connecting rod.
- Mark the cylinder to which it belongs -A-
- Installation position: the markings -B- face the belt pulley side
- Disconnect the new connecting rod. Refer to [C5.4 Connecting Rod, Separating](#), page 103 .

3 - Bearing Shells

- Installation position. Refer to [Fig. "Bear-ing Shell Installation Position"](#), page 100
- Do not interchange used bearing shells (mark them)
- lubricate before installing
- New axial play: 0.10 to 0.35 mm, wear limit: 0.40 mm
- Measure radial clearance with Plastigauge®; new: 0.02 to 0.06 mm, wear limit: 0.09 mm Do not turn crankshaft when checking radial clearance



A13-10485

4 - Relief Valve

- 27 Nm

5 - Oil Spray Jet

- For piston cooling

6 - Circlip

- Replace after removing

7 - Piston Pin

- lubricate before installing

8 - Piston

- Removing and installing. Refer to [R5.2 emoving and Installing](#), page 100 .
- Mark installed position and cylinder allocation
- Arrow on piston face points toward belt pulley side
- Check piston and cylinder bore. Refer to [a5.3 nd Cylinder Bore, Checking](#), page 101 .



9 - Compression Rings

- Use piston ring pliers (commercially available) for removing and installing
- Offset gaps by 120°
- Installed Position: "TOP" "R" mark must face up toward piston crown
- Ring Gap/Groove Clearance, Checking. Refer to [⇒ Fig. "Piston Ring Groove Clearance, Checking"](#), [page 102](#).

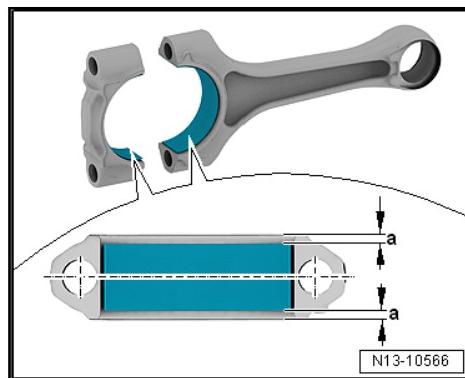
10 - Oil Scraping Ring

- Two-part
- Install offset gaps by 120° to the neighboring compression ring
- The "TOP" or "R" marking must face toward the piston crown.
- Checking the ring gap. Refer to [⇒ Fig. "Checking the Piston Ring Gap"](#), [page 102](#).
- Side clearance cannot be measured.

11 - Connecting Rod

- Always replace as a set
- Mark the cylinder to which it belongs -A-
- Installation position: the markings -B- face the belt pulley side
- Disconnect the new connecting rod. Refer to [⇒ C5.4 onnecting Rod, Separating](#), [page 103](#).
- Radial play, measuring. Refer to [⇒ R5.5 ods, Checking Radial Clearance](#), [page 104](#).

Bearing Shell Installation Position



- Place the bearing shells centrally into connecting rod and connecting rod bearing cap.

The dimension -a- must be the same at left and right.

5.2 Pistons, Removing and Installing

Special tools and workshop equipment required

- ◆ Pilot Drift -VW222A-
- ◆ Piston ring compressor, commercially available

Removing

- Secure the engine to the -VAS6095A-. Refer to [⇒ S1.3 ecur-ing to Engine and Transmission Holder](#), [page 20](#).
- Remove the cylinder head. Refer to [⇒ H1.3 ead, Removing and Installing](#), [page 115](#).
- Remove the oil pan upper section. Refer to [⇒ P1.4 an Upper Section, Removing and Installing](#), [page 211](#).
- Label the installation position and the cylinder allocation for the piston.



- Mark installation position and connecting rod cylinder
-item 11- [⇒ Item 11 \(page 100\)](#) .
- Remove the connecting rod bearing cap and remove the piston and connecting rod upward.



Note

If difficult to move, heat the pistons to approximately 60 °C (140 °F)

- Remove the circlip from the piston pin eye.
- Remove the piston pin using the -VW222A-.

Installing

Install in reverse order of removal and note the following:



Note

- ◆ Replace the bolts that were tightened with an additional turn.
- ◆ Arrow on the piston crown points toward belt pulley side.
- ◆ Piston ring gap offset 120°.
- Coat the contact surfaces on the bearing shells with oil.
- Install the piston with a commercially available piston ring compressor. Pay attention to the installation position -item 8- [⇒ Item 8 \(page 99\)](#) .
- Install the connecting rod bearing cap. Pay attention to the installed position -item 2- [⇒ Item 2 \(page 99\)](#) .
- Install the cylinder head. Refer to [⇒ H1.3 ead, Removing and Installing”, page 115](#) .
- Install the oil pan upper section. Refer to [⇒ P1.4 an Upper Section, Removing and Installing”, page 211](#) .

Tightening Specifications

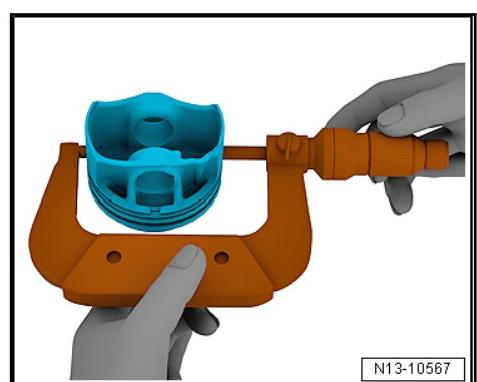
- ◆ Refer to [⇒ -5.1 Piston and Connecting Rod”, page 98](#)

5.3 Pistons and Cylinder Bore, Checking

Special tools and workshop equipment required

- ◆ Outside Micrometer - 75-100mm -VAS6071-

Pistons, Checking



N13-10567

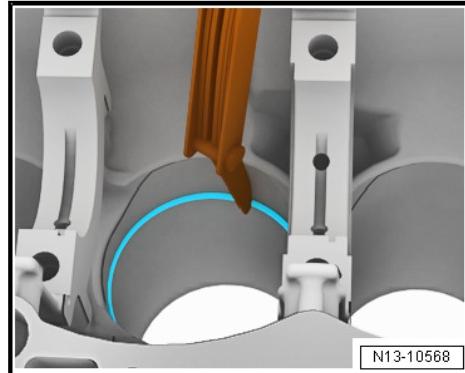


- Measure approximately 15 mm in from the lower edge at a 90° angle to the piston pin axis using a micrometer.
- ◆ Deviation from specified size: maximum 0.04 mm

Standard Dimension	Piston Diameter
in mm	82.42 ¹⁾

• ¹⁾ Measurements without graphite coating (thickness = 0.02 mm). The graphite coating wears off.

Checking the Piston Ring Gap



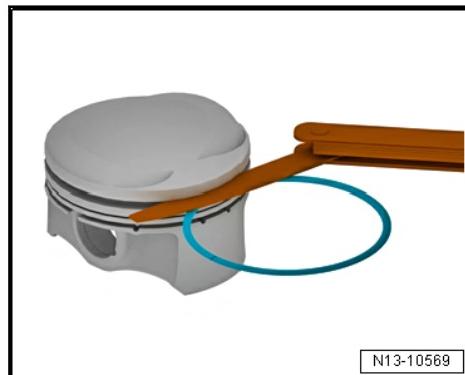
N13-10568

Special tools and workshop equipment required

- ◆ Feeler Gauge
- Push piston ring squarely from above down to approximately 15 mm from bottom end of cylinder. To push in use a piston without rings.

Piston Ring Dimensions in mm	New	Wear Limit
1. Compression ring	0.30 to 0.40	0.80
2. Compression ring	0.40 to 0.50	0.80
Oil Scraping Ring	0.20 to 0.40	0.80

Piston Ring Groove Clearance, Checking



N13-10569

Special tools and workshop equipment required

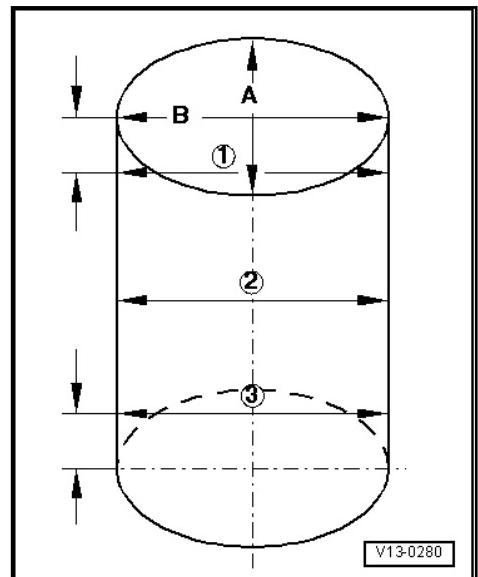
- ◆ Feeler Gauge
- Clean the piston ring groove before checking.

Piston Ring Dimensions in mm	New	Wear Limit
1. Compression ring	0.06 to 0.09	0.20



Piston Ring Dimensions in mm	New	Wear Limit
2. Compression ring	0.03 to 0.06	0.15
Oil scraping rings	cannot be measured	

Checking the Cylinder Bore



Special tools and workshop equipment required

- ◆ Cylinder Dial Bore Gauge -VAS6078-



Note

- ◆ Risk of damaging the cylinder bore surface through incorrect handling.
- ◆ Never handle the cylinder bore with service equipment (drilling, honing, grinding).
- Using a -VAS6078- measure in a diagonal sequence at three positions transversely -A- and longitudinally -B-.
- ◆ Deviation from specified size: maximum 0.08 mm

Standard Dimension	Cylinder Bore Diameter
in mm	82.51



Note

The cylinder bore must not be measured when the cylinder block is mounted on the -VAS6095- because the measurements may be incorrect.

5.4 New Connecting Rod, Separating

A new connecting rod might not be separated all the way at the predetermined breaking point. If the connecting rod bearing cap cannot be removed by hand, proceed as follows:

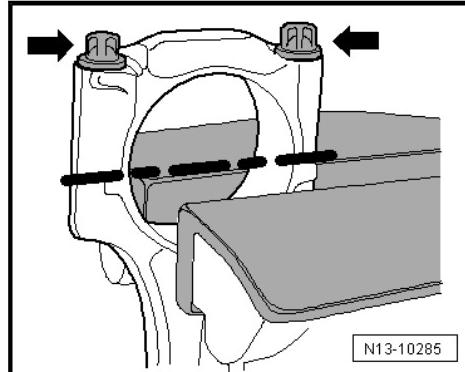
- Label which cylinder goes with the connecting rod -item 11- [⇒ Item 11 \(page 100\)](#).



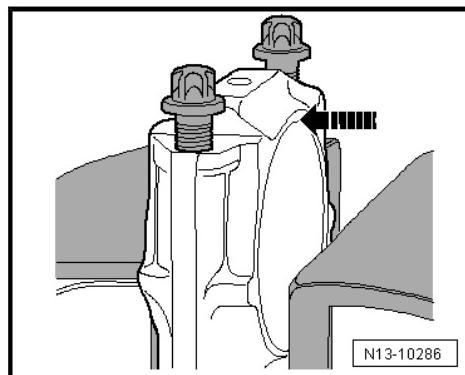
- Lightly clamp the connecting rod in a vise equipped with aluminum protective pads.

Note

- ◆ *Clamp the connecting rod lightly to prevent damaging it.*
- ◆ *Clamp the connecting rod below the dotted line.*
- Loosen the bolts -arrows- approximately five turns.



- Carefully tap against the connecting rod bearing cap in direction of -arrow- with a plastic hammer until the cap is loose.



5.5 Connecting Rods, Checking Radial Clearance

Special tools and workshop equipment required

- ◆ Plastigauge®

Procedure

- Remove the connecting rod bearing cap.
- Clean the bearing cap and pin.
- Place the Plastigauge® over the entire width of the bearing journal or into the bearing shells.
- Position the connecting rod bearing cap and tighten the old bolts -item 1- [Item 1 \(page 99\)](#) without turning the crank-shaft.
- Remove the connecting rod bearing cap again.
- Compare the width of Plastigauge® with calibrated scale.

Radial clearance:



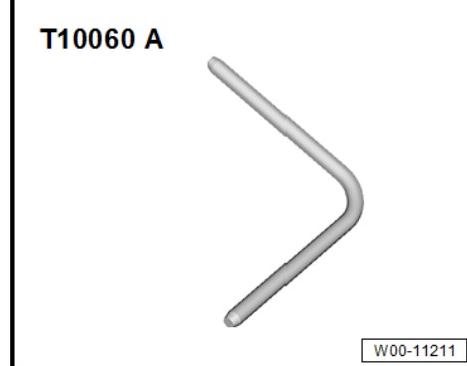
- New: 0.02 to 0.06 mm.
- Wear limit: 0.09 mm.
- Replace the connecting rod bolts.



6 Special Tools

Special tools and workshop equipment required

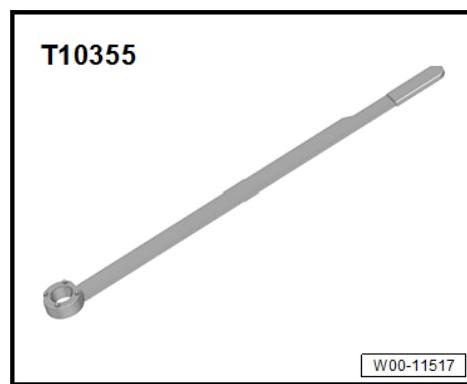
- ◆ Locking Pin -T10060A-



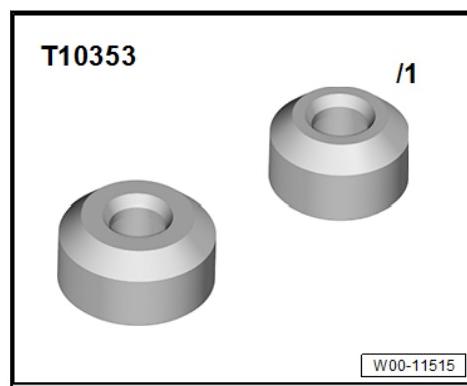
- ◆ Bits for V.A.G. 1331/13 -T10099-



- ◆ Counterhold - Vibration Damper -T10355-

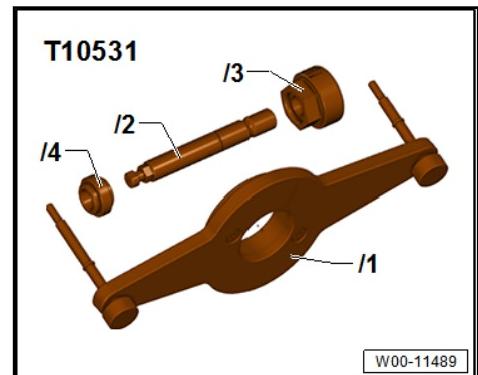


- ◆ Seal Installer, Intermediate Shaft -T10356/1-





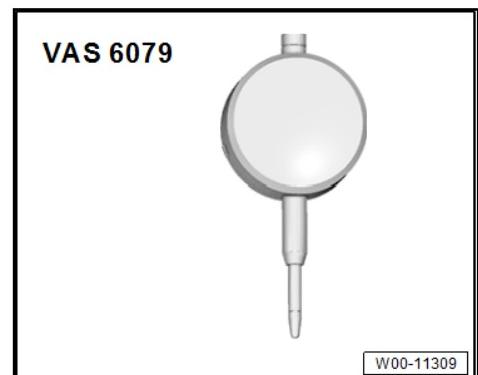
◆ Vibration Damper Assembly Tool -T10531-



◆ Seal Installer - Sealing Flange Guide Sleeve -T20097-



◆ Dial Gauge - 0-10mm -VAS6079-



◆ Shop Crane - Drip Tray -VAS6208-

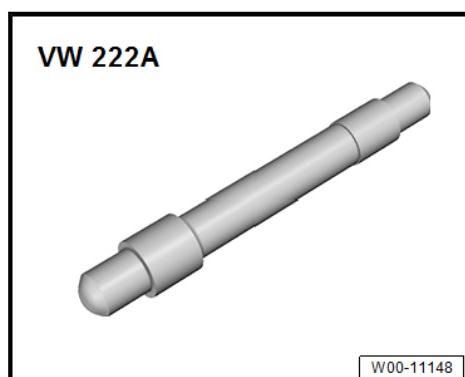




- ◆ Bearing Installer - Bearing Press Piece -VW207C-



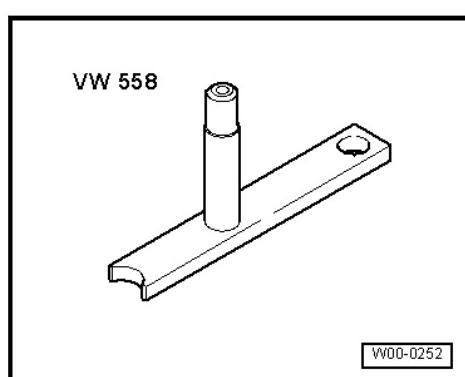
- ◆ Pilot Drift -VW222A-



- ◆ Dial Gauge Holder -VW387-



- ◆ Flywheel Lock Adapter -VW558-





- ◆ Internal puller, for example Puller - Kukko Internal - 14-19mm -21/2-

Kukko 21/2



W00-11233

- ◆ Counter-support, for example Puller - Kukko Counterstay -22/1-

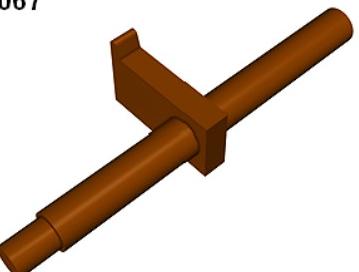
Kukko 22/1



W00-11226

- ◆ Flywheel Retainer -3067-

3067



W00-11122



15 – Cylinder Head, Valvetrain

1 Cylinder Head

- ⇒ [-1.1 Cylinder Head", page 110](#)
- ⇒ [-1.2 Camshaft Housing", page 113](#)
- ⇒ [H1.3 head, Removing and Installing", page 115](#)
- ⇒ [P1.4ump, Removing and Installing", page 120](#)
- ⇒ [C1.5 hecking", page 122](#)

1.1 Overview - Cylinder Head



Note

- ◆ Replace the cylinder head bolt.
- ◆ Always replace self-locking nuts, bolts which have been tightened to tightening specification as well as gaskets and seals.
- ◆ The plastic protectors installed to protect the open valves must only be removed immediately before mounting the cylinder head.
- ◆ The engine oil and the coolant must be changed if the cylinder head or the cylinder head gasket are being replaced.

**1 - Alignment Pin****2 - Cylinder Head Gasket**

- Replace after removing
- Installed position: the part number faces the cylinder head

3 - Cylinder Head

- Removing and installing. Refer to [H1.3 Head, Removing and Installing](#), page 115.
- Checking for distortion. Refer to [Fig. "Cylinder Head, Checking for Distortion"](#), page 113

4 - Bolt

- 4 Nm +90° additional turn
- Replace after removing
- Follow the procedure when loosening. Refer to [Fig. "Loosening the Cylinder Head"](#), page 112
- Follow the procedure when tightening. Refer to [Fig. "Cylinder Head Tightening Sequence"](#), page 112

5 - Heat Shield**6 - Bolt**

- 9 Nm

7 - Bolt

- 9 Nm

8 - Heat Shield**9 - Bolt**

- 9 Nm

10 - Bolt

- 9 Nm

11 - Connection

- For coolant hose

12 - O-ring

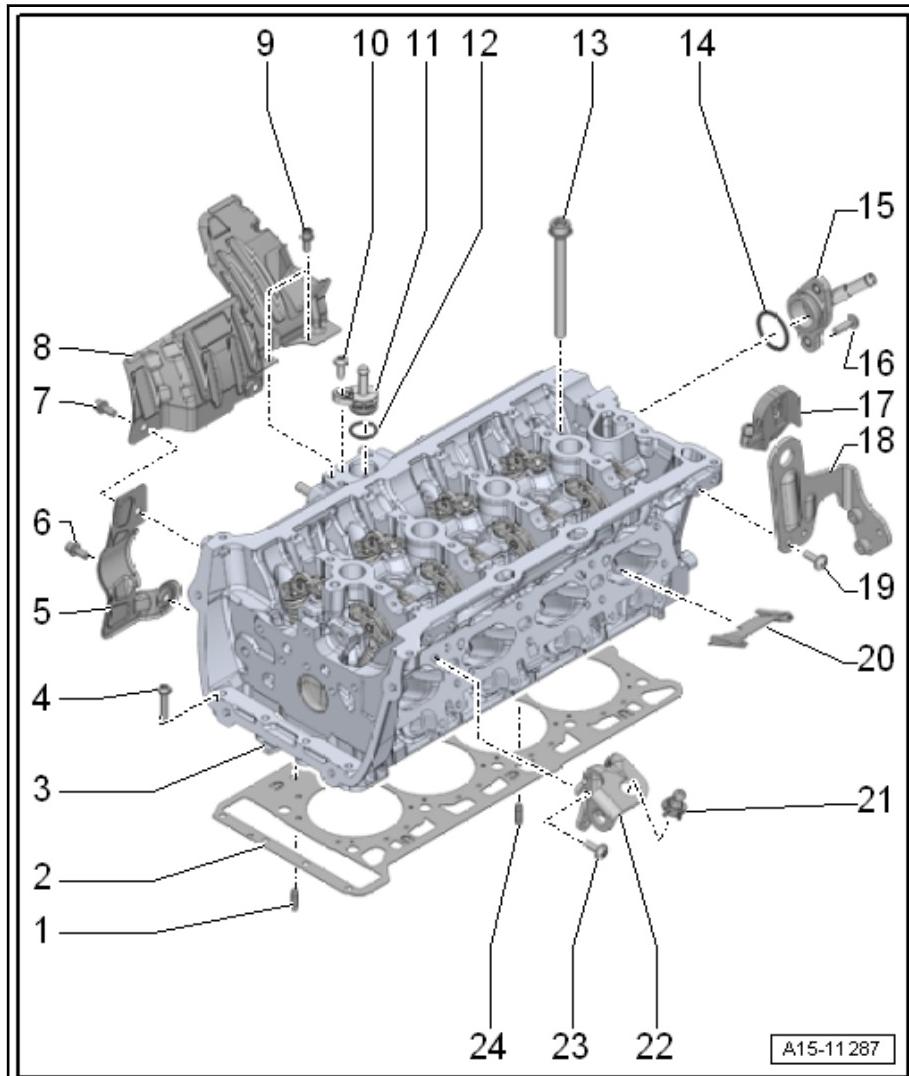
- Replace after removing
- Coat with coolant

13 - Cylinder Head Bolt

- Replace after removing
- Follow the procedure when loosening. Refer to [Fig. "Loosening the Cylinder Head"](#), page 112
- Follow the procedure when tightening. Refer to [Fig. "Cylinder Head Tightening Sequence"](#), page 112

14 - O-ring

- Replace after removing



A15-11287



- Coat with coolant

15 - Connection

- For coolant hose

16 - Bolt

- 9 Nm

17 - Mount

- For engine cover

18 - Engine Lifting Eye

19 - Bolt

- 8 Nm +90° additional turn
- Replace after removing

20 - Partition Plate

21 - Ball Pin

- For engine cover

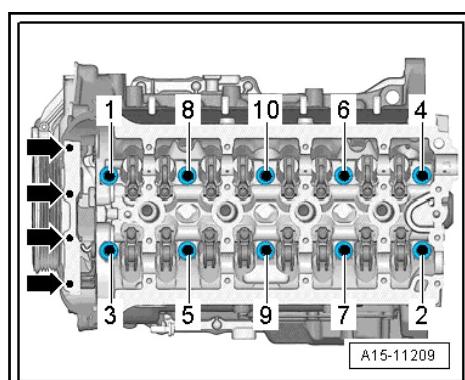
22 - Engine Lifting Eye

23 - Bolt

- 8 Nm +90° additional turn
- Replace after removing

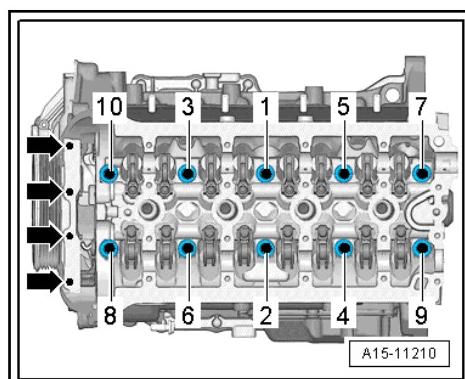
24 - Alignment Pin

Loosening the Cylinder Head



- Remove the bolts -arrows-.
- Loosen the cylinder head bolts in order from -1 to 10-.

Cylinder Head Tightening Sequence

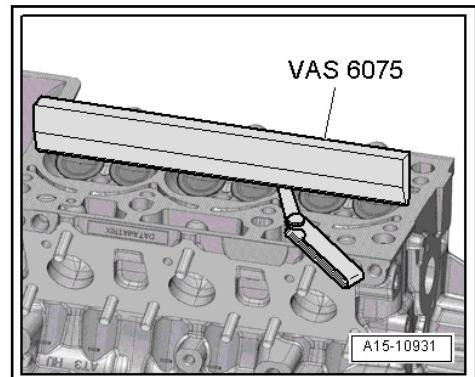




- Tighten the cylinder head bolts in sequence -1 to 10- and -arrows-.

Step	Bolts	Tightening Specification/Additional Turn
1.	-1- through -10-	40 Nm
2.	-1- through -10-	Turn an additional 90°.
3.	-1- through -10-	Turn an additional 90°.
4.	Bolts -arrows-	4 Nm
5.	Bolts -arrows-	Turn an additional 90°.

Cylinder Head, Checking for Distortion



- Check the cylinder head at several locations for distortion using a -VAS6075- and a feeler gauge.
- ◆ Maximum permissible distortion: 0.05 mm

1.2 Overview - Camshaft Housing

**1 - Cylinder Head****2 - Ball Pin**

- 9 Nm
- For engine cover

3 - O-ring

- Replace after removing
- Coat with engine oil

4 - Plugs**5 - Oil Separator**

- Removing and installing. Refer to [S3.2 separator, Removing and Installing](#), page 224 .

6 - Bolt

- Tightening specification and sequence. Refer to [Fig. "Oil Separator - Tightening Sequence"](#), page 223 .

7 - Seal

- Replace after removing

8 - Vacuum Pump

- Removing and installing. Refer to [P1.4 pump, Removing and Installing](#), page 120 .

9 - Bolt

- Tightening specification. Refer to [Fig. "Vacuum Pump - Tightening Specifications"](#), page 114 .

10 - Gasket

- Replace if damaged

11 - O-ring

- Replace after removing
- Coat with engine oil

12 - Camshaft Position Sensor -G40-

- Overview. Refer to [-1.1 Ignition System](#), page 384 .

13 - Bolt

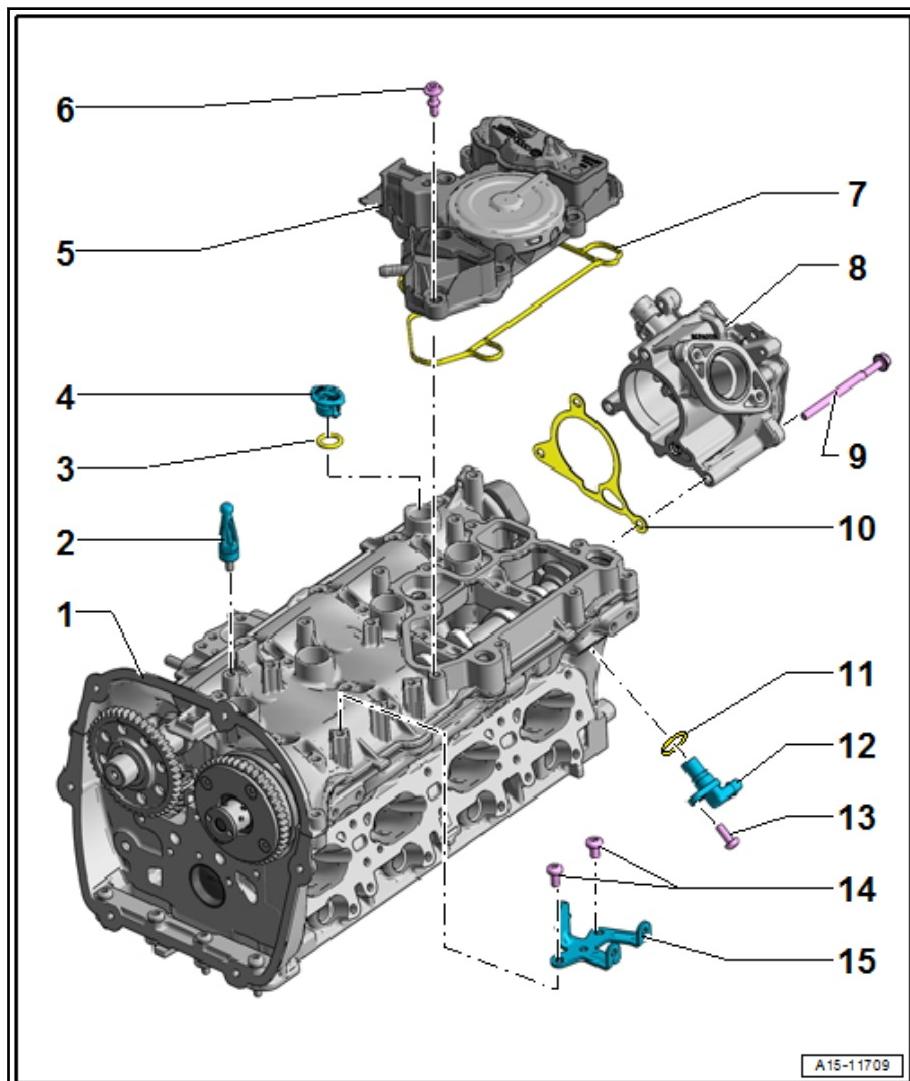
- Tightening specification. Refer to [-1.1 Ignition System](#), page 384 .

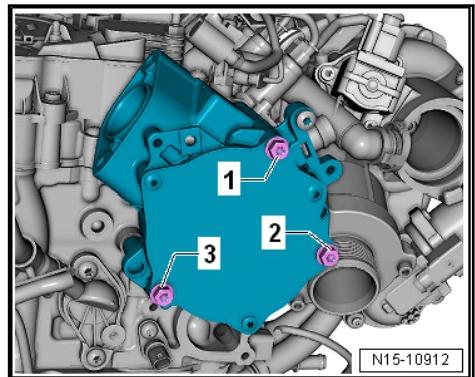
14 - Bolts

- 9 Nm

15 - Bracket

- For EVAP Canister Purge Regulator Valve 1 -N80-

**Vacuum Pump - Tightening Specifications**



Tighten with a new bolts as follows:

Step	Bolts	Tightening Specification/Additional Turn
1.	-1 through 3-	Install hand-tight
2.	-1 through 3-	8 Nm
3.	-1 through 3-	180° additional turn

1.3 Cylinder Head, Removing and Installation

Special tools and workshop equipment required

- ◆ Engine Bung Set -VAS6122-

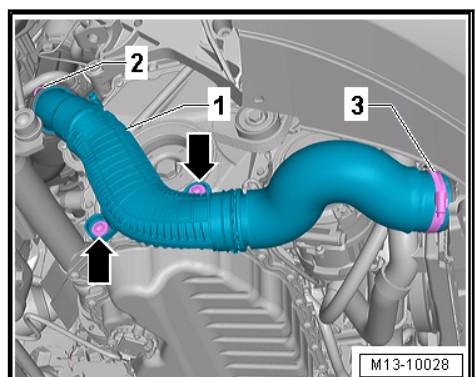
Removing



Note

If the camshaft timing chain is also being replaced, the cylinder head must first be installed again. The engine can only be supported in the installation position when the cylinder head is installed.

- Drain the coolant. Refer to [D1.3 draining and Filling](#), page [239](#).
- Remove the bolts -arrows-.



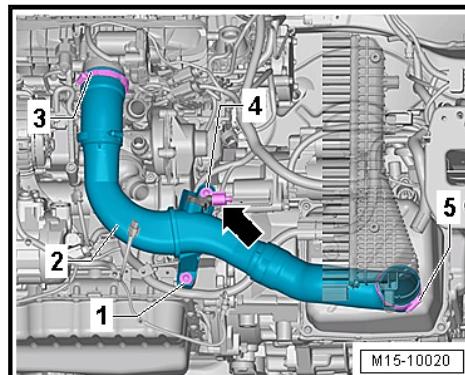
- Remove the air duct pipe by lifting the clip -2- and opening the screw-type clamp -3-.
- Remove the camshafts. Refer to [R4.2 removing and Installing](#), page [167](#).
- Remove the catalytic converter. Refer to [C2.2 onverter, Removing and Installing](#), page [374](#).



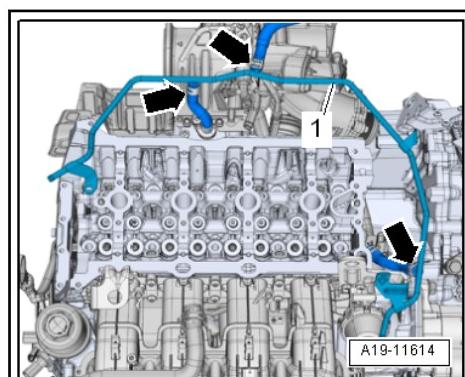
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4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

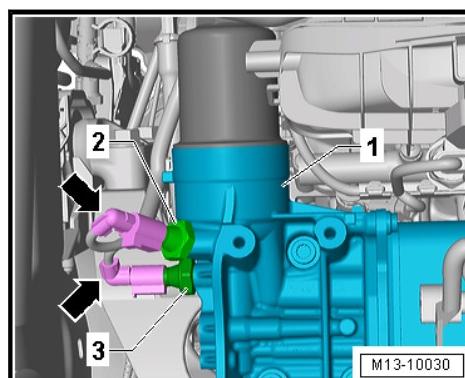
- Remove the Oxygen Sensor 1 Before Catalytic Converter -GX10-. Refer to [⇒ O₂ oxygen Sensor](#), page 361 .
- Loosen the hose clamp -3 and 5-.
- Disconnect the connector from the Charge Air Pressure Sensor -G31- -arrow-.
- Remove the bolts -1 and 4- and then remove the air duct pipe downward.



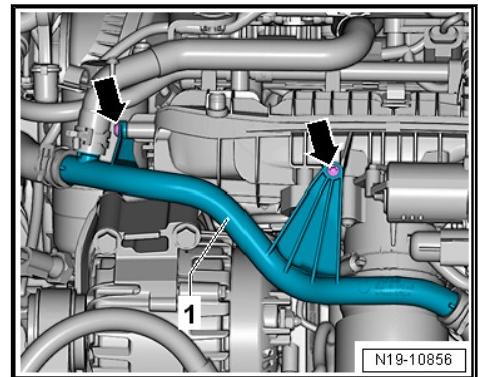
- Seal the open lines and connections with clean plugs from the -VAS6122-.
- Loosen the clamps -arrows- and remove the coolant hoses.
- Swing the coolant line -1- to the side.



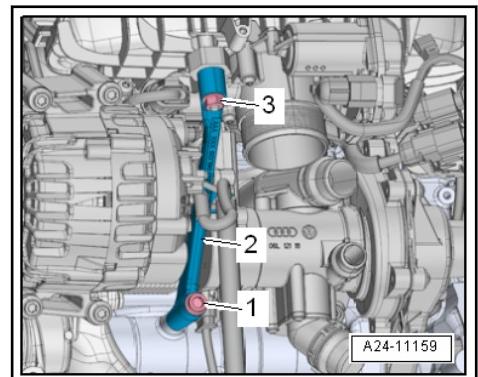
- Disconnect the connectors -top arrow- for the Oil Pressure Switch - F1- -3-.
- Disconnect the connectors -bottom arrow- for the Reduced Oil Pressure Switch -F378- -2-.



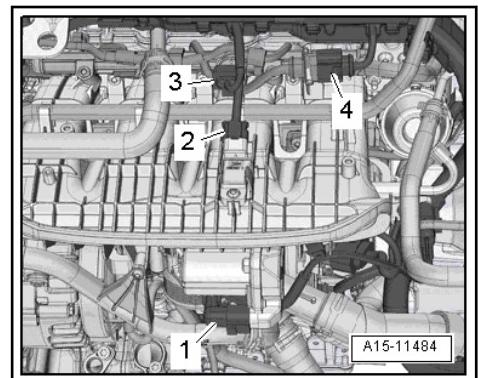
- Remove the bolts -arrows-.



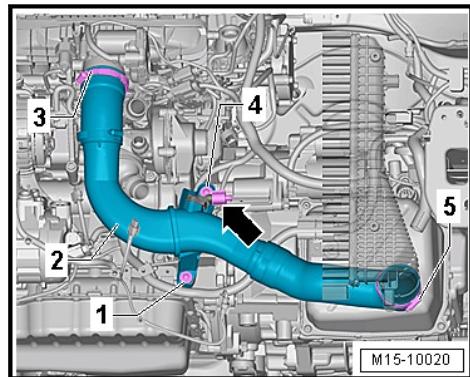
- Remove the bolt -1- and the nut -3- and then remove the bracket -2- for the intake manifold.



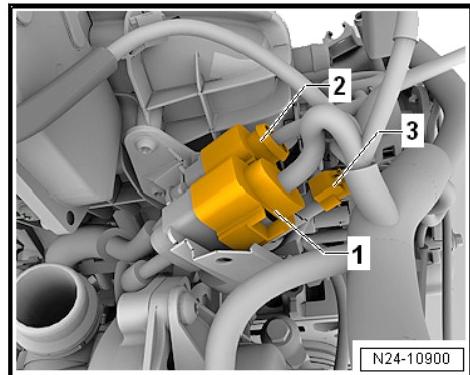
- Disconnect the connectors:



- 1 - For Throttle Valve Control Module -GX3-
 - 2 - For the Intake Air Temperature Sensor -G42-/Manifold Absolute Pressure Sensor -G71-
- Remove the connector -4- from the bracket.
 - Free up the wiring harness and push it to the side.
 - Loosen the hose clamp -3 and 5-.



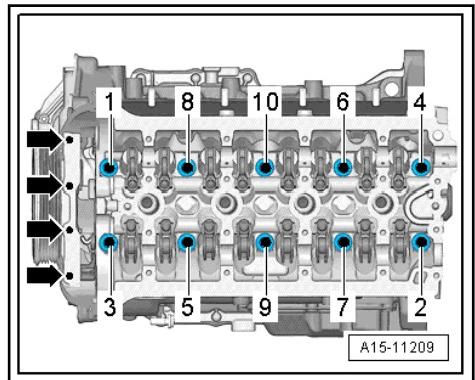
- Disconnect the connector from the Charge Air Pressure Sensor -G31- -arrow-.
- Remove the bolts -1 and 4- and then remove the air duct pipe downward.
- Disconnect the connectors -1, 2 and 3- underneath the intake manifold.



- Remove the turbocharger. Refer to [R1.2 removing and Installing](#), page 292 .
- Remove the bolts -arrows-.
- Remove the cylinder head bolts in the sequence -1 to 10-.

 **Note**

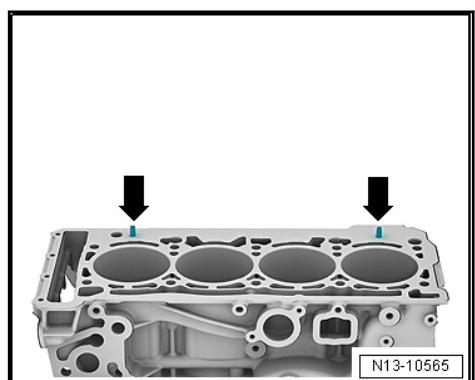
- ◆ *Make sure all wires and cables are disconnected.*
- ◆ *Pay attention to the tension and guide tracks when lifting the cylinder head.*
- Remove the cylinder head.
- Lay the cylinder head on a soft surface, such as foam.



Installing

Note

- ◆ Replace the bolts that were tightened with an additional turn.
- ◆ Replace the gaskets, seals and self-locking nuts.
- ◆ The hose supports, air duct pipes and hoses must be free of oil and grease before installing.
- ◆ Secure all hose connections with standard production hose clamps. Refer to the Parts Catalog.
- ◆ Spray the bolts on the used clamps with rust remover before installing.
- Only unpack the new cylinder head gasket immediately prior to installation. The silicon layer and the cylinder head gasket recessed area must not be damaged.
- Carefully remove the sealant residue from cylinder head and cylinder block. Make sure that no long grooves or scratches result. Carefully remove all lapping and sanding residue.
- Clean the cylinder head bolt blind holes. If necessary blow out with compressed air.
- Position the cylinder head gasket.



- ◆ Pay attention to centering pins in cylinder block -arrows-.
- ◆ Pay attention to the cylinder head gasket installation position: the part number must be readable from the intake side.
- If the crankshaft was turned in the meantime, bring the piston for cylinder 1 to TDC and then turn the crankshaft back again slightly. Take care not to damage the timing chain in the process.



- Position the cylinder head.
- Install and tighten the cylinder head bolt. Tightening sequence. Refer to [Fig. "Cylinder Head Tightening Sequence", page 112](#).
- Install the camshaft but the camshaft timing chain is not installed yet. Refer to [page 175](#).
- Support the engine in its installed position again. Refer to [S2.5 Supporting in Installation Position", page 32](#).
- Remove the engine mount and the engine support.
- Now install the camshaft timing chain. Refer to [page 178](#).

Further assembly is performed in the reverse order of removal, but observe the following:

- Replace the engine oil. Refer to [Maintenance; Booklet 20.2; Procedure Descriptions; Engine Oil, Draining or Extracting, Changing Oil Filter and Filling Oil](#).
- Fill with new coolant. Refer to [D1.3 Raining and Filling", page 239](#).

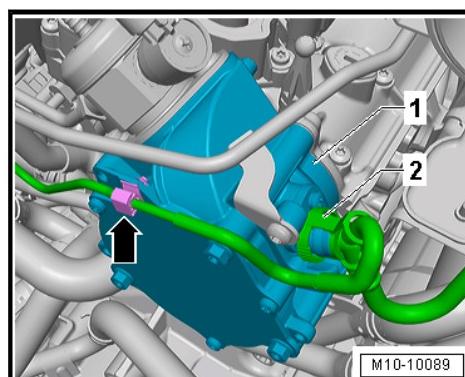
Tightening Specifications

- ◆ Refer to [-1.1 Cylinder Head", page 110](#).
- ◆ Refer to [-4.1 Intake Manifold", page 331](#)
- ◆ Refer to [-3.1 Coolant Pipes", page 264](#)
- ◆ Refer to [-1.1 Turbocharger", page 286](#)
- ◆ Refer to [Electrical Equipment; Rep. Gr. 97; Control Modules; Component Location Overview - Control Modules](#).

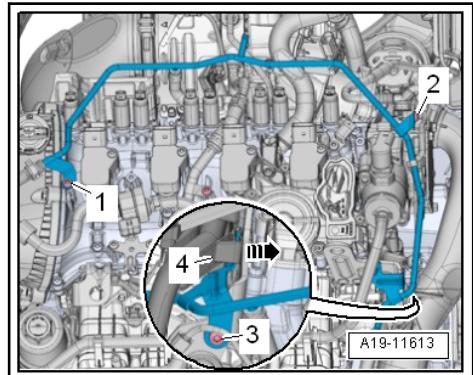
1.4 Vacuum Pump, Removing and Installing

Removing:

- Remove the engine cover. Refer to [C3.1 over, Removing and Installing", page 40](#).
- Remove the air filter housing. Refer to [F3.2 filter Housing, Removing and Installing", page 329](#).
- Unclip the vacuum line -2- from the bracket -arrow-.
- Disconnect the vacuum hose -2-.



- Remove the bolts -1, 2 and 3- and carefully move the coolant line slightly to the side.



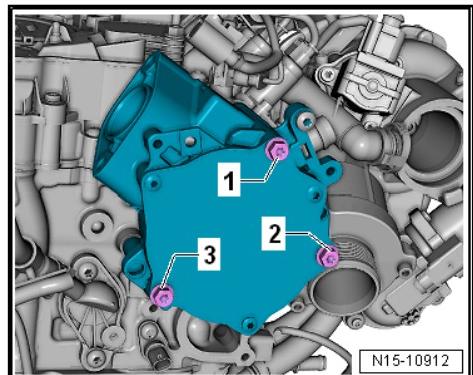
Note

- ◆ *Risk of destroying the coolant pipes through deformation.*
- ◆ *Never change the coolant pipe bend shape.*
- Remove the high pressure pump with the »roller tappet«. Refer to [P7.2 High Pressure Pump, Removing and Installing](#), page 357 .
- Loosen the bolts -1 through 3- and remove the vacuum pump.

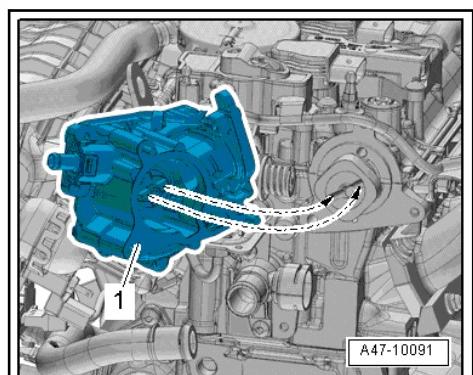
Note

Do not disassemble the vacuum pump.

- The bolt -2- remains because of limited space after loosening the vacuum pump.



Installing





- Clean the sealing surfaces.
- Turn the vacuum pump coupling plate so that it engages in the camshaft groove when installing the vacuum pump.
- Position the new seal on the vacuum pump and insert the two bolts. Position the vacuum pump with the seal on the cylinder head.
- While doing so pay attention that it lays flush on the flange.

Further assembly is performed in the reverse order of the removal.

- Install the high pressure pump with »roller tappet«. Refer to [⇒ P7.2 pressure Pump, Removing and Installing](#), page 357 .

Tightening Specifications

- ◆ Refer to [⇒ Fig. "Vacuum Pump - Tightening Specifications"](#), page 114

1.5 Compression, Checking

Special tools and workshop equipment required

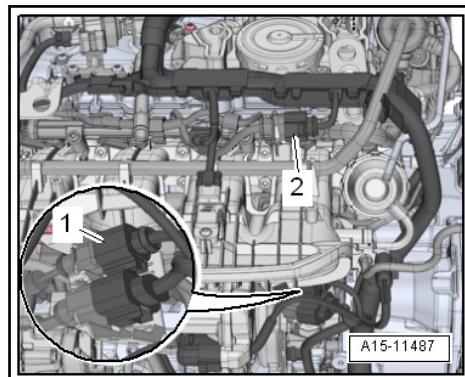
- ◆ Spark Plug Removal Tool -3122B-
- ◆ Compression Tester Kit -VAG1763-
- ◆ Compression Tester Kit - Adapter 5A -VAG1381/5A-

Test Sequence

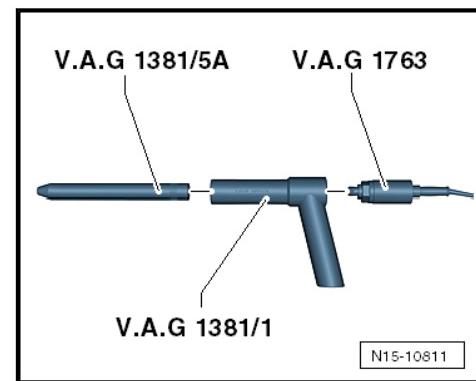


Note

- ◆ *Engine oil temperature: minimum 30 °C (86 °F)*
- ◆ *Battery voltage at least 12.7 V*
- Remove the ignition coils. Refer to [⇒ C1.3 oils with Power Output Stages, Removing and Installing](#), page 386 .
- Disconnect the connectors for the fuel injectors:



- 1 - For Cylinder 1 Fuel Injector -N30- to Cylinder 4 Fuel Injector -N33-
 - 2 - For Cylinder 1 Fuel Injector 2 -N532- to Cylinder 4 Fuel Injector 2 -N535-
- Remove the spark plugs using a -3122B-.
 - Check the compression pressure using the -VAG1763- and -VAG1763/6-.



Note

Information on using the tester. Refer to the Operating Instructions.

- Operate the starter until the tester no longer indicates a pressure increase.

Compression Pressure	Pressure
New	11.0 to 14.0 bar (160 to 203 psi)
Wear limit	7.0 bar (101.52 psi)
Maximum difference between cylinders	3.0 bar (43.5 psi)

- Install the spark plugs. Refer to ⇒ Maintenance; Booklet 20.2.
- Install the ignition coils. Refer to [⇒ C1.3 oils with Power Output Stages, Removing and Installing](#), page 386 .

Note

By separating the connections, DTCs will be stored. After the test, check and erase the DTC memory.

- Turn on the ignition and select the following menu items on the Vehicle Diagnostic Tester:
 - ◆ [01 - Engine electronics]
 - ◆ [Guided Functions]
 - ◆ [01 - generate readiness code]



2 Timing Chain Cover

- ⇒ [-2.1 Timing Chain Cover", page 124](#)
- ⇒ [C2.2 hain Cover, Removing and Installing", page 127](#)
- ⇒ [D2.3 amper Sealing Ring, Replacing", page 135](#)

2.1 Overview - Timing Chain Cover

**1 - Bolt**

- Tightening sequence. Refer to [Fig. "Upper Timing Chain Cover - Tightening Sequence"](#), page 126.

2 - Upper Timing Chain Cover

- Removing and installing. Refer to [Fig. "Upper Timing Chain Cover - Tightening Sequence"](#), page 126.

3 - Cap**4 - Bolt**

- 4 Nm 45°
- Replace after removing

5 - Camshaft Adjustment Valve 1 -N205-

- Removing and installing. Refer to [C4.3 amshaft Adjustment Valve 1N205, Removing and Installing](#), page 185.

6 - Seal

- Replace after removing

7 - Seal

- Replace if damaged

8 - O-ring

- Replace after removing
- Coat with oil before assembly

9 - Engine**10 - Lower Timing Chain Cover**

- Replacing. Refer to [T2.2.2 iming Chain Cover, Removing and Installing](#), page 129.
- With shaft seal
- Dependent on the sealing compound sealant, bends the cover when removing. For this reason the cover must always be replaced after removing.

11 - Shaft Seal

- Replacing. Refer to [D2.3 amper Sealing Ring, Replacing](#), page 135.
- For the vibration damper

12 - Plugs

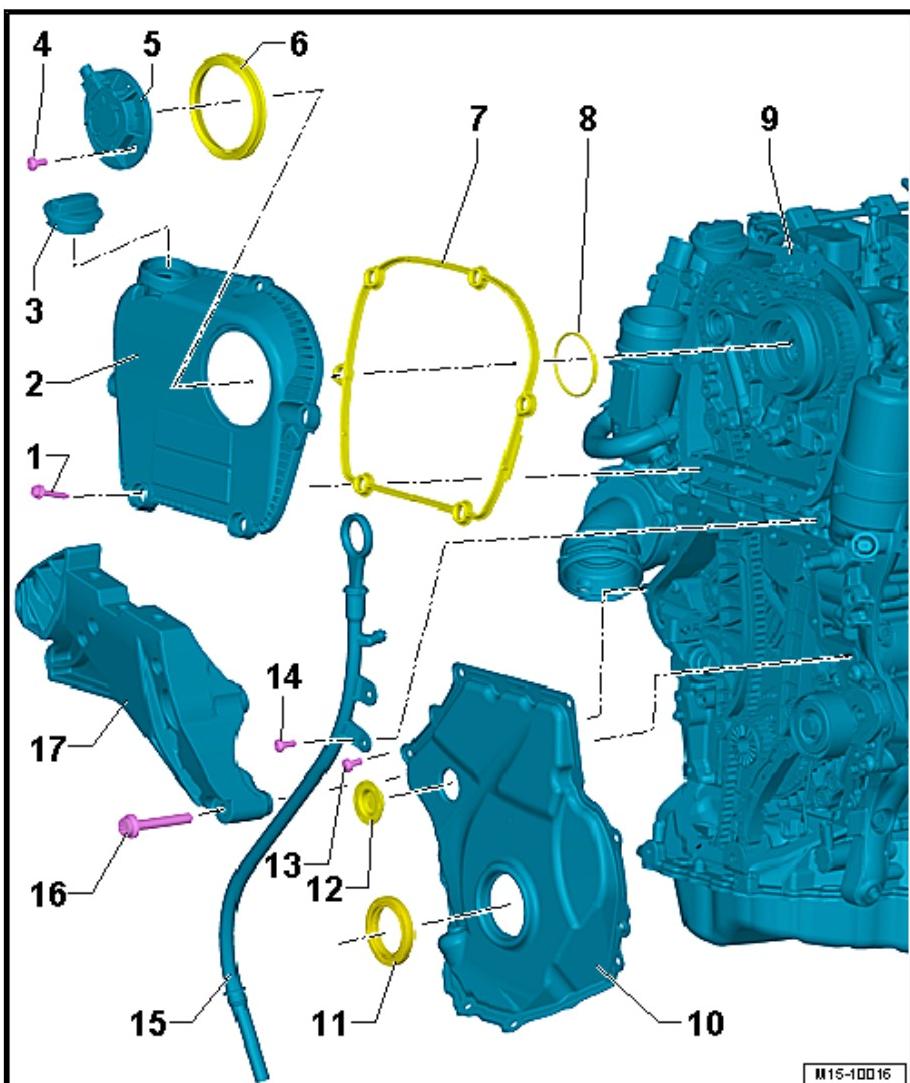
- Replace after removing

13 - Bolt

- Tightening sequence eight bolts. Refer to [Fig. "Lower Timing Chain Cover - Eight Bolt Tightening Sequence"](#), page 126
- Tightening sequence 15 bolts. Refer to [Fig. "Lower Cover for Timing Chain - Tightening Sequence for 15 Bolts"](#), page 127
- Replace after removing

14 - Bolt

- 9 Nm





15 - Oil Dipstick Tube

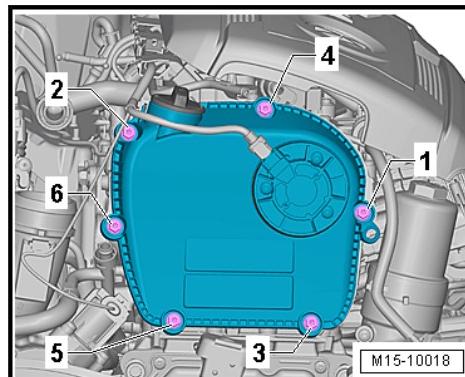
16 - Bolt

- Engine support to engine -item 1- [Item 1 \(page 27\)](#)

17 - Engine Support

- Removing and installing. Refer to [S1.6 upport, Removing and Installing", page 62](#).

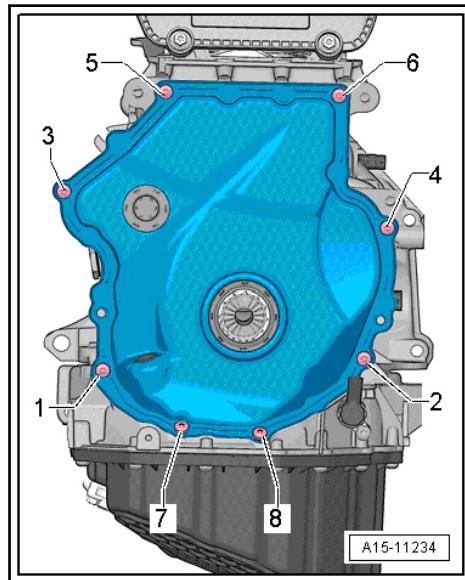
Upper Timing Chain Cover - Tightening Sequence



- Tighten the bolts -1 through 6- in the sequence shown:

Step	Bolts	Tightening Specification/Additional Turn
1.	-1 through 6-	Install by hand all the way
2.	-1 through 6-	9 Nm

Lower Timing Chain Cover - Eight Bolt Tightening Sequence



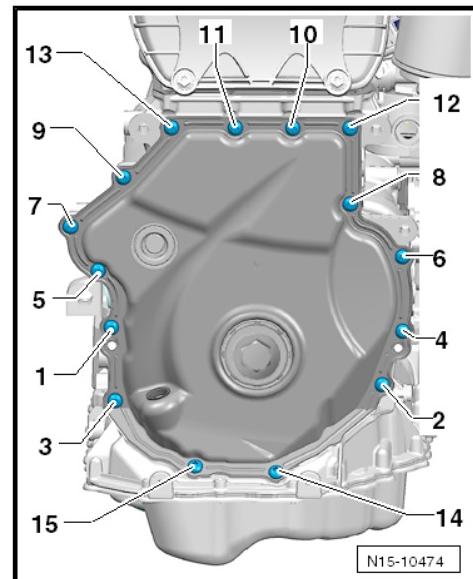
- Tighten the bolts -1 through 8- in three stages in the sequence shown:

Step	Bolts	Steel Bolts	Aluminum Bolts
1.	-1 through 8-	8 Nm	4 Nm
2.	-2 to 3 and 5 to 8	45° additional turn	45° additional turn



Step	Bolts	Steel Bolts	Aluminum Bolts
3.	-1 and 4-	After installing the vibration damper tighten with an additional turn.	After installing the vibration damper tighten with an additional turn.

Lower Cover for Timing Chain - Tightening Sequence for 15 Bolts



- Tighten the bolts -1 through 15- in three stages in the sequence shown:

Step	Bolts	Steel Bolts	Aluminum Bolts
1.	-1 through 15-	8 Nm	4 Nm
2.-1, 2, 4, 5 and 7 to	145° additional turn	45° additional turn	
3.	-3 and 6-	After installing the vibration damper tighten with an additional turn.	After installing the vibration damper tighten with an additional turn.

2.2 Timing Chain Cover, Removing and Installing

⇒ [T2.2.1 Timing Chain Cover, Removing and Installing", page 127](#)

⇒ [T2.2.2 Timing Chain Cover, Removing and Installing", page 129](#)

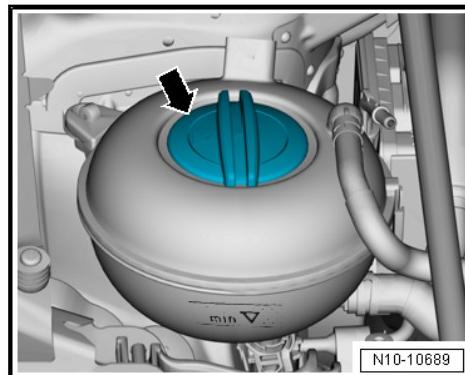
2.2.1 Upper Timing Chain Cover, Removing and Installing

Special tools and workshop equipment required

- ♦ Hose Clip Pliers -VAS6362-
- ♦ Sealant. Refer to the Parts Catalog.

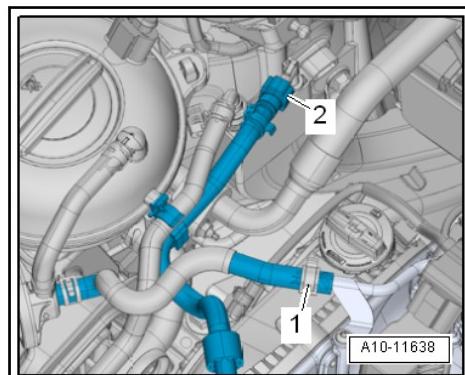


Removing



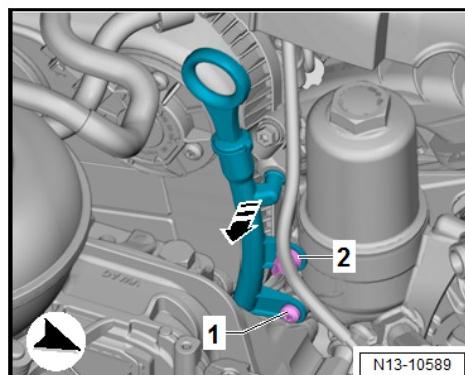
N10-10689

- The engine is cold.
- Briefly open the coolant reservoir cap -arrow- to reduce the residual pressure in the coolant system.
- Remove the engine cover. Refer to [C3.1 over, Removing and Installing](#), page 40 .
- Loosen the hose clamps -1-, remove the coolant hose and push to the right side.



A10-11638

- Press the release button on the EVAP canister hose -2-, remove the hose and free it up.
- Remove the Camshaft Adjustment Valve 1 -N205-. Refer to [C4.3 amshaft Adjustment Valve 1N205, Removing and Installing](#), page 185 .
- Remove the bolt -1-.



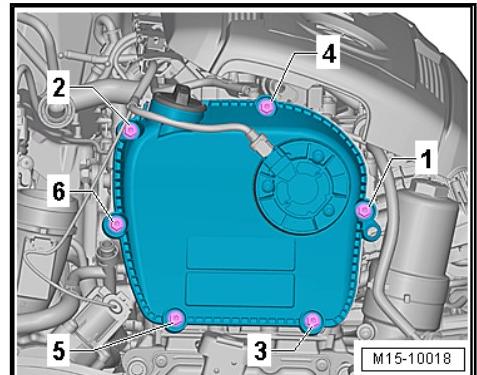
N13-10589

- Unclip the oil dipstick tube from the timing chain upper cover in direction of -arrow-.



Ignore -item 2-.

- Unclip the wiring harness for the camshaft adjustment valves and free up.
- Remove the bolts -1 through 6- and the upper cover for the timing chain.



Installing

Install in reverse order of removal and note the following:

- Replace the seal.
- Install the upper timing chain cover. Refer to [Fig. "Upper Timing Chain Cover - Tightening Sequence"](#), page 126 for the tightening sequence.
- Install the Camshaft Adjustment Valve 1 -N205-. Refer to [C4.3 Camshaft Adjustment Valve 1N205, Removing and Installing](#), page 185 .
- Install the engine cover. Refer to [C3.1 cover, Removing and Installing](#), page 40 .

Tightening Specifications

- ◆ Refer to [-2.1 Timing Chain Cover](#), page 124

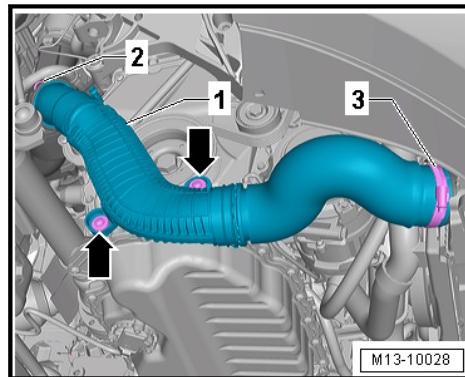
2.2.2 Lower Timing Chain Cover, Removing and Installing

Special tools and workshop equipment required

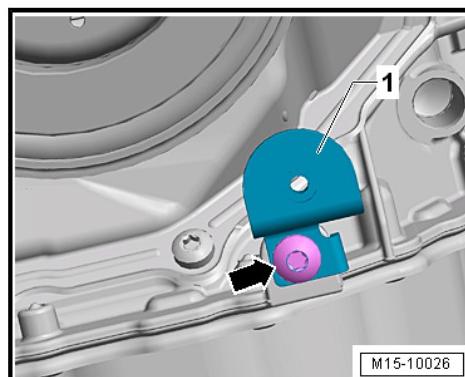
- ◆ Press Piece - Timing Chain Cover -T10368-
- ◆ Socket T30 -T10405-
- ◆ Vibration Damper Assembly Tool -T10531-

Removing

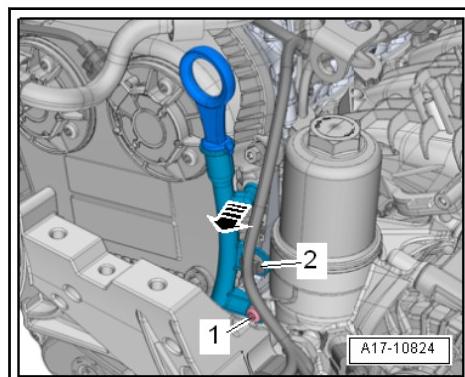
- Remove the right front wheel housing liner. Refer to [Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing](#).
- Remove the bolts -arrows-.



- Remove the air duct pipe by lifting the clip -2- and opening the screw-type clamp -3-.
- Remove the bolt -arrows- and remove bracket -1-.



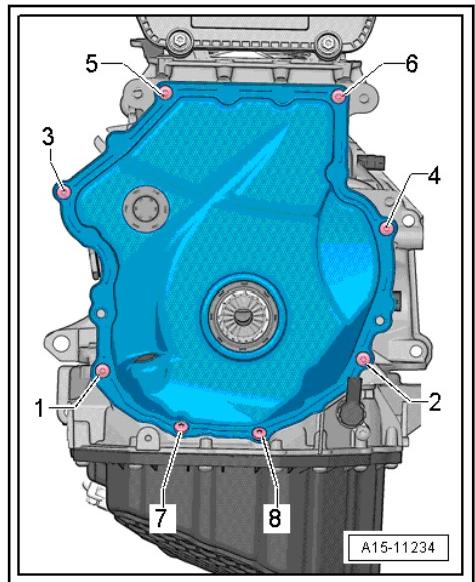
- Remove the engine support. Refer to [S1.6 upport, Removing and Installing](#), page 62 .
- Remove the ribbed belt tensioner. Refer to [B1.3 elt Tensioner, Removing and Installing](#), page 51 .
- Remove the vibration damper. Refer to [D1.4 amper, Removing and Installing](#), page 51 .
- Free up the clip -2- for the electrical wiring harness.



- Remove the bolt -1-.
- Unclip the guide tube from the timing chain upper cover in direction of -arrow-.
- Remove the guide tube from the timing chain guard.

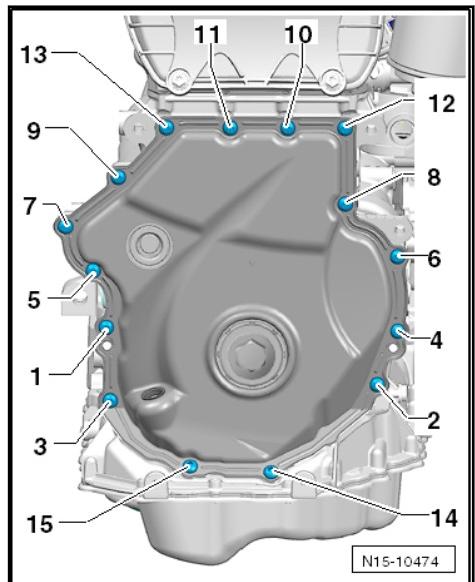


Procedure with Eight Bolts



- Remove the bolts -3- using the -T10405-.
- Remove the remaining bolts -1 through 8-.

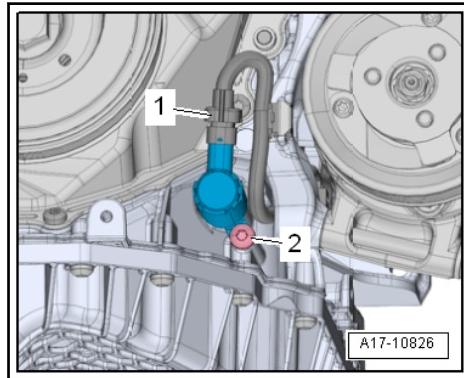
Procedure with 15 Bolts.



- Remove the bolts -5 and 7- with the -T10405-.
- Remove the remaining bolts -1 through 15-.

Continuation for All Vehicles

- Remove the Oil Pressure Regulation Valve -N428-. Refer to [≥ O4.6 Oil Pressure Regulation Valve N428, Removing and Installing](#), page 232 .



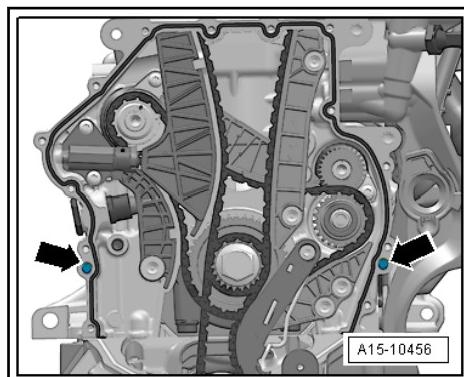
- Pry off the lower timing chain cover.

Installing

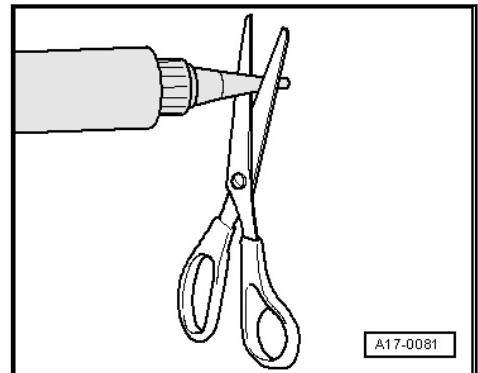


Note

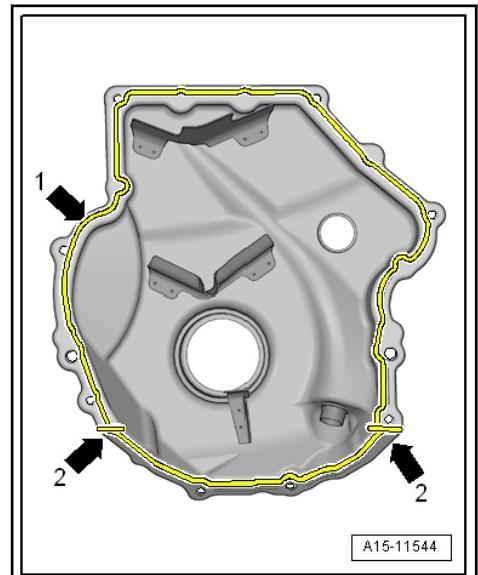
- ◆ Be sure to check the expiration date of the silicone sealant.
 - ◆ Silicone sealant. Refer to the Parts Catalog.
 - ◆ The cover must be installed within five minutes after applying the silicone sealant.
 - ◆ Replace sealing ring and O-ring.
 - ◆ Risk of contaminating the lubricating system. Cover open parts of the engine.
- Remove any sealant residue on the cylinder block using a flat blade scraper.
 - Clean any oil or grease off the sealing surfaces.
 - Make sure both alignment bushings for centering the cover -arrows- are present.



- Cut the tube nozzle at the front marking (nozzle diameter: approximately 3 mm).

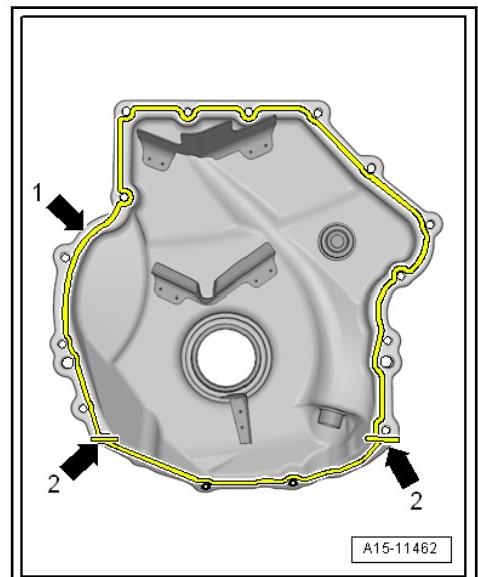


A17-0081

Lower Timing Chain Cover - Sealant Application for Eight Bolts

A15-11544

- Apply the silicone sealant to the clean sealing surface -arrow 1- and on the edges -arrows 2- of the new cover as shown.

Lower Cover for Timing Chain - Sealant Application for 15 Bolts

A15-11462



Jetta 2011 >, Jetta 2015 >

4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

- Apply the silicone sealant to the clean sealing surface -arrow 1- and on the edges -arrows 2- of the new cover as shown.
- Sealant bead thickness: 2 to 3 mm.

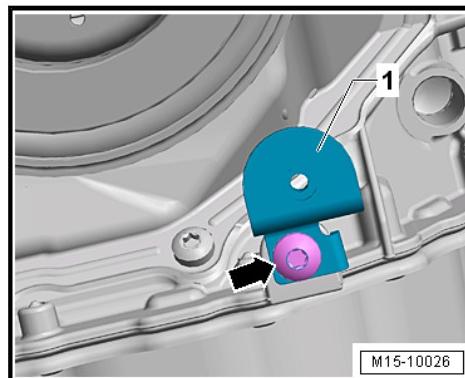
 Note

- ◆ *The cover must be installed within five minutes after application of silicone sealant.*
- ◆ *The sealant bead may not be thicker than specified, otherwise excess sealant could enter the oil pan and clog the oil intake pipe screen.*
- Mount the cover immediately and tighten the bolts. Tightening sequence -item 13- [⇒ Item 13 \(page 125\)](#).

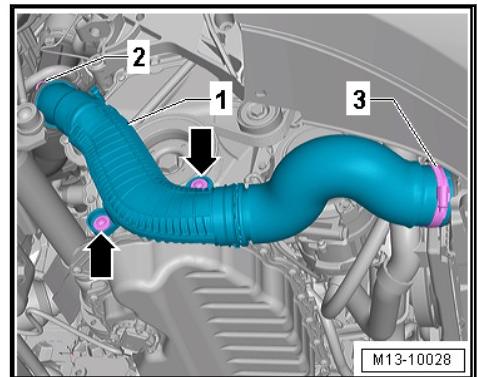
 Note

After installing cover, allow sealant to dry for approximately 30 minutes. Only afterward may the engine oil be replenished.

- Install the vibration damper. Refer to [⇒ D1.4 amper, Removing and Installing](#), page 51.
- Install the Oil Pressure Regulation Valve -N428-. Refer to [⇒ O4.6 il Pressure Regulation Valve N428, Removing and Installing](#), page 232.
- Install the ribbed belt tensioning damper. Refer to [⇒ B1.5 racket, Removing and Installing](#), page 58.
- Install the Oil Pressure Regulation Valve -N428-. Refer to [⇒ O4.6 il Pressure Regulation Valve N428, Removing and Installing](#), page 232.
- Install the air duct pipe bracket.



- Install the ribbed belt. Refer to [⇒ B1.2 elt, Removing and Installing](#), page 49.
- Install the air duct pipe -1-.



- Install the right front wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing.
- Check the oil level. Refer to ⇒ Maintenance; Booklet 20.2.

Tightening Specifications

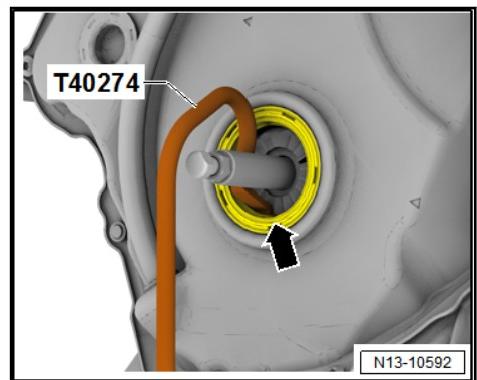
- ◆ Refer to ⇒ [-2.1 Timing Chain Cover](#), page 124
- ◆ Refer to ⇒ [Fig. “Engine Support - Tightening Specification and Sequence”](#), page 28
- ◆ Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Overview - Front Wheel Housing Liner.

2.3 Vibration Damper Sealing Ring, Replacing

Special tools and workshop equipment required

- ◆ Seal Installer - Crankshaft -T10354-
- ◆ Press Piece - Gearbox -T10375-
- ◆ Knurled Nut -T10531/4- from the Vibration Damper Assembly Tool -T10531-
- ◆ Seal Installer - Crankshaft -T40274-

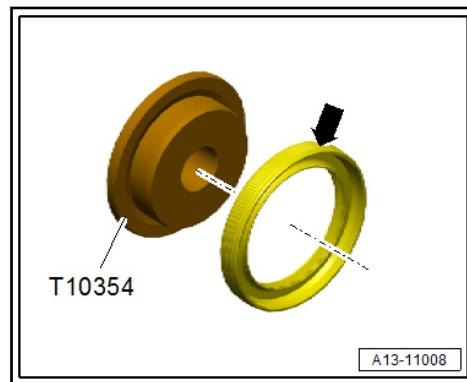
Removing



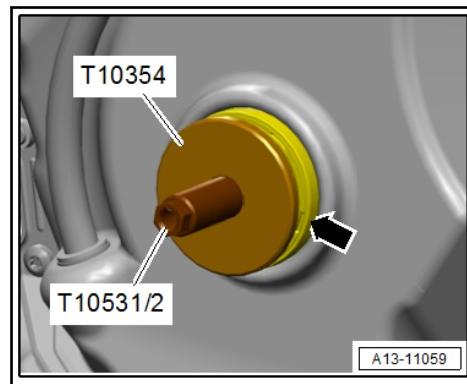
- Remove the vibration damper. Refer to ⇒ [D1.4 amper, Removing and Installing](#), page 51 .
- The -T10531/2- is installed.
- Remove the seal -arrow- with the -T40274-.



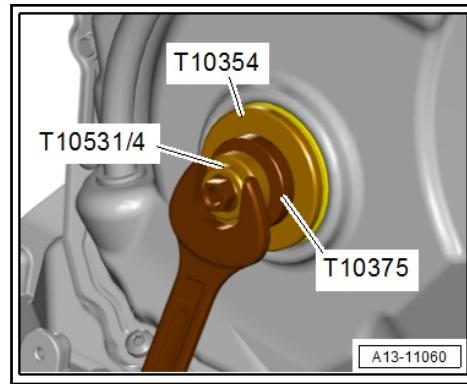
Installing



- Clean the contact and sealing surface.
- Push the seal -arrow- on the -T10354-.
- The closed side of the seal points to the -T10354-.
- Push the seal -arrow- with the -T10354- on the -T10531/2- and place on the lower timing chain cover.



- Additionally attach the -T10375- and tighten the -T10531/4-.



- Drive the seal in all the way using the -T10354-.



Note

- ◆ Replace the vibration damper bolt.
- ◆ Replace the O-ring.

Further assembly is performed in the reverse order of the removal. Note the following:



- Install the vibration damper. Refer to [D1.4 amper, Removing and Installing](#), page 51 .



3 Chain Drive

- ⇒ [-3.1 Camshaft Timing Chains", page 138](#)
- ⇒ [-3.2 Balance Shaft Drive Chain", page 142](#)
- ⇒ [T3.3 iming Chain, Removing and Installing", page 145](#)
- ⇒ [S3.4 haft Drive Chain, Removing and Installing", page 160](#)
- ⇒ [C3.5 hain, Checking", page 161](#)
- ⇒ [T3.6 iming, Checking", page 162](#)

3.1 Overview - Camshaft Timing Chains

**1 - Bolt**

- Aluminum bolts 4 Nm +90°
- Steel bolts 9 Nm
- Aluminum bolts, replace after removal

2 - Chain Tensioner

- Is under tension
- Secure with the Tensioner Locking Tool - T40267- before removing

3 - Timing Chain Tensioning Rail**4 - Guide Pin**

- 20 Nm

5 - Bolt

- Replace after removing
- Tightening specification and sequence. Refer to [Fig. "Bearing Bracket - Tightening Specifications and Sequence", page 140](#).

6 - Control Valve

- 35 Nm
- Left-hand thread
- Depending on the version, remove using the Assembly Tool - T10352/2- or Assembly Tool -T10352/4-.
- Check using the Vehicle Diagnostic Tester [Fig. "Checking the Control Valve", page 140](#).

7 - Bolt

- Replace after removing

M 6 bolt

- 8 Nm +90°

M8 Bolt:

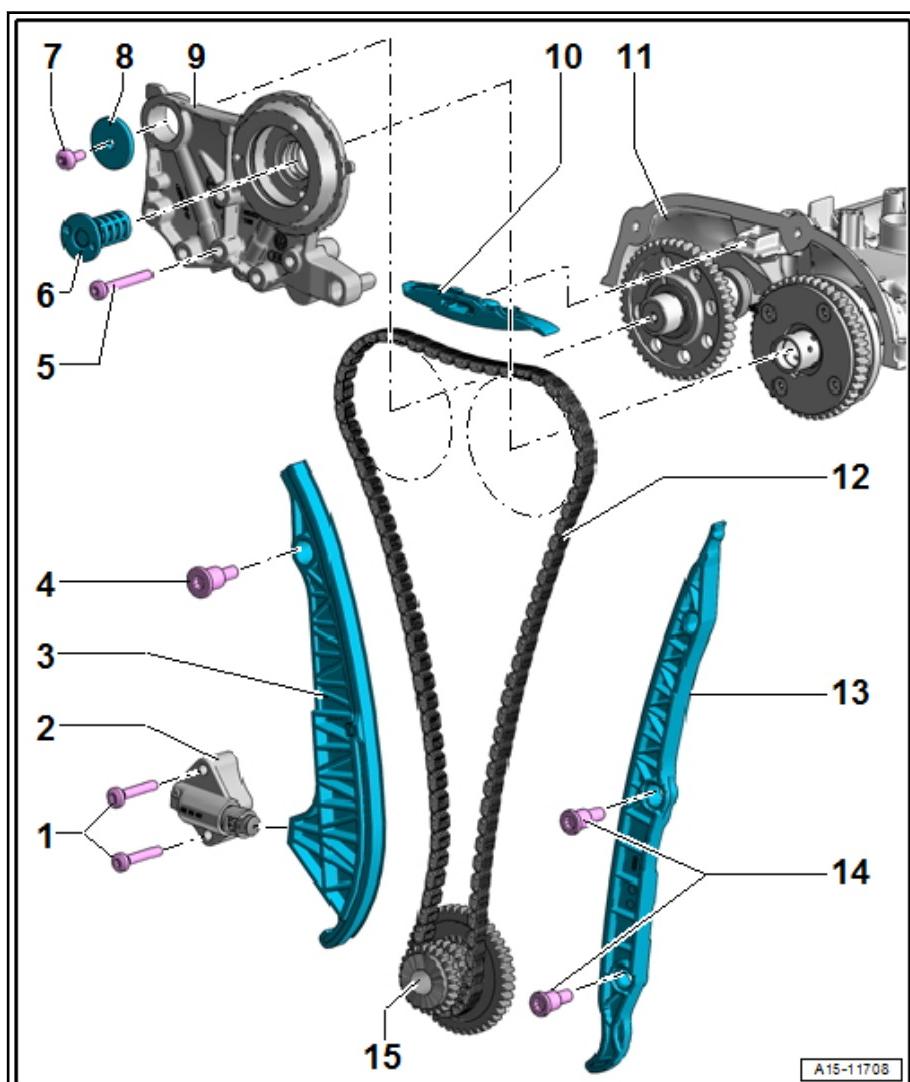
- 20 Nm +90°

8 - Washer**9 - Bearing Bracket**

- Depending on the version with adapter sleeve. Refer to the [Electronic Parts Catalog \(ETKA\)](#) for the allocation.
- Tightening specification and sequence. Refer to [Fig. "Bearing Bracket - Tightening Specifications and Sequence", page 140](#).
- Assembly instructions. Refer to [Fig. "Bearing Bracket - Assembly Instructions", page 140](#).

10 - Camshaft Timing Chain Guide Rail**11 - Camshaft Housing****12 - Camshaft Timing Chain**

- Before removing, mark the running direction with paint





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4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

- Removing and Installing. Refer to [T3.3 Timing Chain, Removing and Installing](#), page 145 .

13 - Camshaft Timing Chain Guide Rail

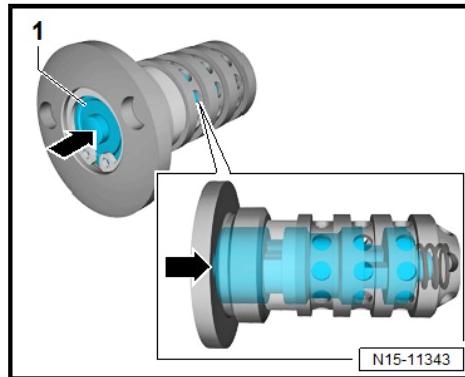
14 - Guide Pin

- 20 Nm

15 - Three Stage Chain Sprocket

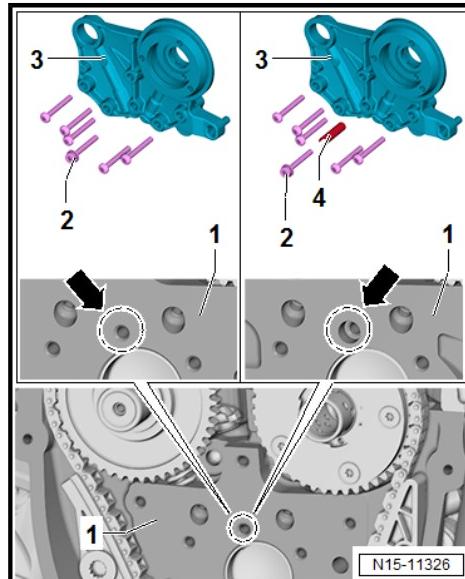
- Crankshaft
- Installation position. Refer to [Fig. "Three Stage Chain Sprocket - Installed Position"](#), page 141 .

Checking the Control Valve



- The piston -1- must be pushed in approximately 3 mm against the spring force. It Must Not Become Stuck While Doing So.

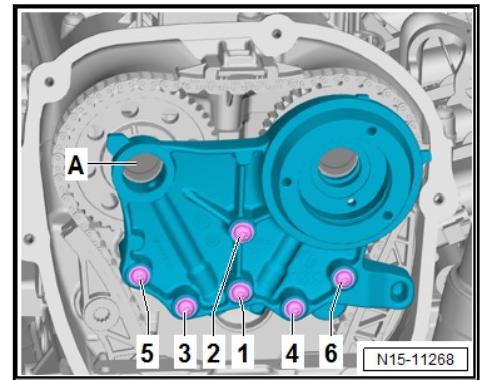
Bearing Bracket - Assembly Instructions



If a new bearing bracket -3- with adapter sleeve -4- should be installed, it must be checked before installing the bearing bracket in the hole -arrow- in the cylinder head -1-.

If the hole -arrow- is not designed for using the adapter sleeve -4- the adapter sleeve must be removed from the bearing bracket. A shorter bolt -2- must also be used for this hole. Refer to the [Electronic Parts Catalog \(ETKA\)](#) for the correct bolt.

Bearing Bracket - Tightening Specifications and Sequence



If an adapter sleeve is installed, this will be moved with the bolt -1- in the cylinder head.

- Tighten the bolts in the steps in the sequence shown:

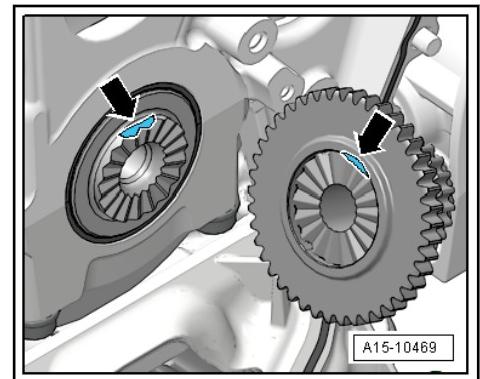
Bearing Bracket with Adapter Sleeve and Steel Bolts

Step	Bolt	Tightening specification/additional turn for steel bolts
1.	-1-	3 Nm
2.	-1 to 6-	9 Nm

Bearing Bracket without Adapter Sleeve and Aluminum Bolts

Step	Bolt	Tightening specification/additional turn for aluminum bolts
1.	-1 to 6-	4 Nm
2.	-1 to 6-	180°

Three Stage Chain Sprocket - Installed Position



- Both surfaces -arrows- must align.



3.2 Overview - Balance Shaft Drive Chain

Note

- ◆ After performing work on the chain drive the adaptation value in the engine control module must be adapted. To do so, turn on the ignition and select the following menu items on the Vehicle Diagnostic Tester:
 - ◆ 01 - Engine electronics
 - ◆ Guided Functions
 - ◆ 01 - Adaptation after repair work on the chain drive

**1 - Guide Pin**

- 20 Nm

2 - Tensioning Rail

- For the timing chain

3 - Balance Shaft

- Must be replaced after removing
- Exhaust side
- Lubricate the bearing with engine oil
- Replacing. Refer to [S4.2.2 haft, Removing and Installing, Exhaust Side](#), page 93.

4 - Guide Pin

- 20 Nm

5 - Guide Rail

- For the timing chain

6 - Chain Tensioner

- 85 Nm
- Insert with locking compound. Refer to the Parts Catalog.

7 - Seal**8 - Cylinder Block****9 - O-ring**

- Lubricate with engine oil

10 - Mounting Pin

- Lubricate with engine oil
- Installation position. Refer to [Fig. "Mounting Pins - Installation Position"](#), page 144

11 - Intermediate Sprocket

- The intermediate sprocket must be replaced if the bolt -item 13- [Item 13 \(page 143\)](#) is loosened.

12 - Washer**13 - Bolt**

- Replace after removing
- The intermediate sprocket -item 11- [Item 11 \(page 143\)](#) must be replaced if the bolt is loosened.
- Tightening sequence. Refer to [Fig. "Intermediate Sprocket Tightening Sequence"](#), page 144

14 - Guide Rail

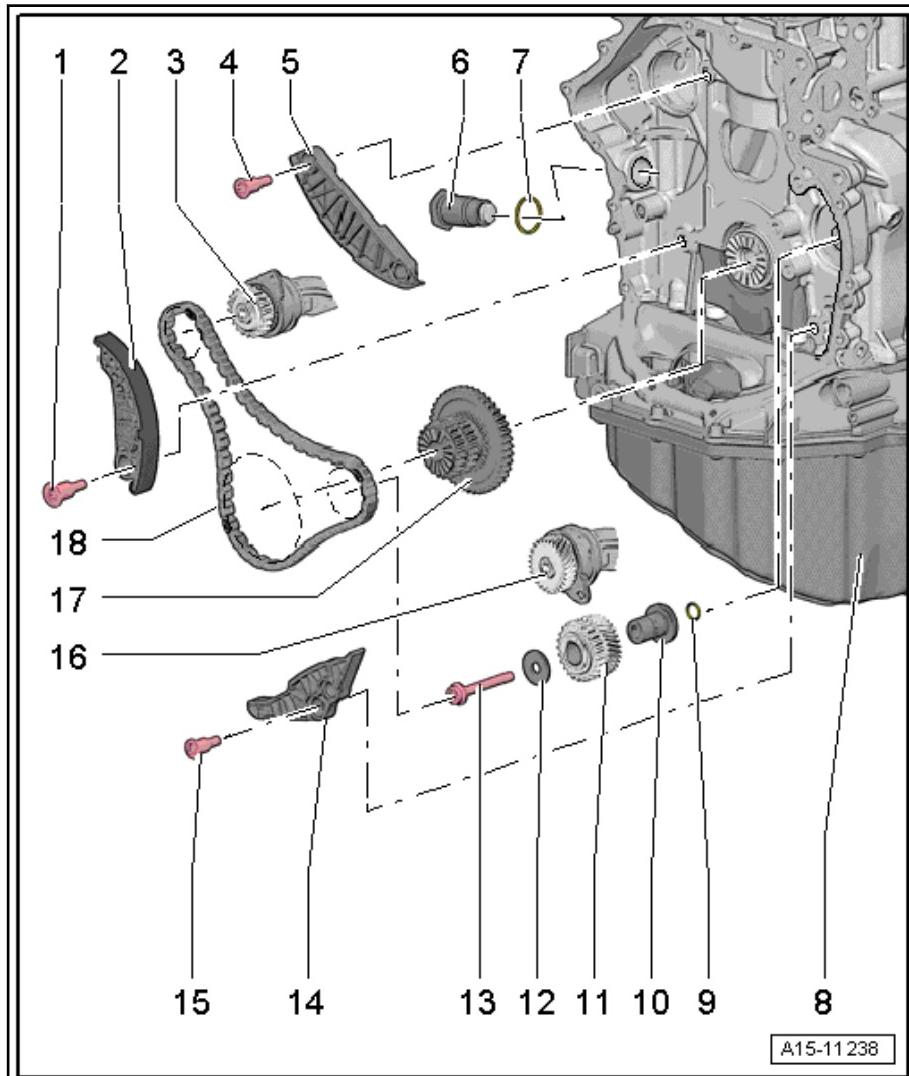
- For balance shaft timing chain

15 - Guide Pin

- 20 Nm

16 - Balance Shaft

- Must be replaced after removing
- Intake side
- Lubricate the bearing with engine oil
- Replacing. Refer to [S4.2.1 haft, Removing and Installing, Intake Side](#), page 90 .

17 - Three Stage Chain Sprocket

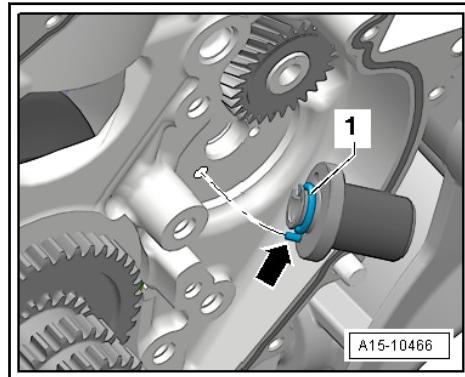


- Installation position. Refer to [Fig. "Three Stage Chain Sprocket - Installed Position"](#), page 141

18 - Balance Shaft Drive Chain

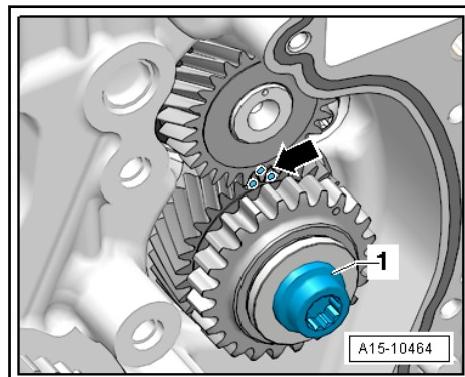
- Removing. Refer to [S3.4 haft Drive Chain, Removing and Installing](#), page 160 .

Mounting Pins - Installation Position



- Replace and lubricate the O-ring -1-
- The alignment pin -arrow- for the bearing pins must engage in the hole in the cylinder block.
- Lubricate the bearing pins

Intermediate Sprocket Tightening Sequence



Note

- ◆ Always replace the intermediate sprocket. Otherwise the backlash will not adjust itself and it could result in engine damage.
 - ◆ The new intermediate sprocket has an anti-friction coating that wears off after a short period of use, which automatically adjusts the backlash.
- Tighten with a new bolt as follows:

Step	Bolts	Tightening Specification/Additional Turn
1.	-1-	10 Nm
2.	-1-	The intermediate sprocket must not have any play. Loosen and tighten it again if necessary.
3.	-1-	25 Nm



Step	Bolts	Tightening Specification/Additional Turn
4.	-1-	Turn an additional 90°.

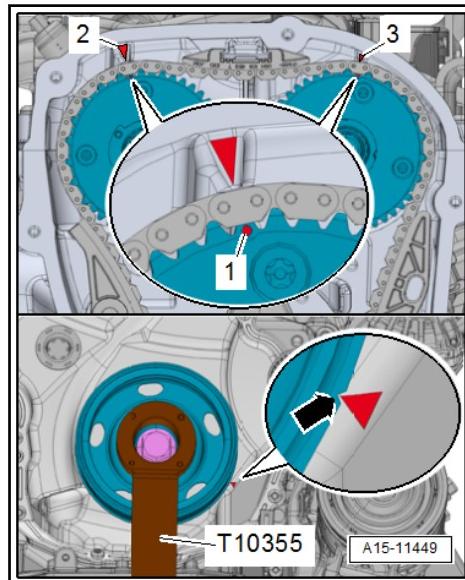
3.3 Camshaft Timing Chain, Removing and Installing

Special tools and workshop equipment required

- ◆ Assembly Tool -T10352/2-
- ◆ Counterhold - Vibration Damper -T10355-
- ◆ Locking Pin (3 pc.) -T40011-
- ◆ Chain Tensioner Lever -T40243-
- ◆ Chain Tensioner Locking Tool -T40267-
- ◆ Camshaft Locks -T40271-
- ◆ Elbow Assembly Tool -T40266-
- ◆ Vibration Damper Assembly Tool -T10531-
- ◆ Counterhold - Multiple Use -T10172A- with Counterhold - Kit - Adapter 2 -T10172/2-

Removing

- Support the engine in the installation position. Refer to [S2.5 Supporting in Installation Position](#), page 32 .
- Remove the engine mount. Refer to [M2.2 Mount, Removing and Installing](#), page 29 .
- Remove the engine support. Refer to [S1.6 Support, Removing and Installing](#), page 62 .
- Remove the upper timing chain cover. Refer to [T2.2.1 Timing Chain Cover, Removing and Installing](#), page 127 .
- Remove the noise insulation. Refer to [Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation](#).
- Remove the right wheel housing liner. Refer to [Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing](#).
- Turn the vibration damper with the -T10355- to the “TDC point”.

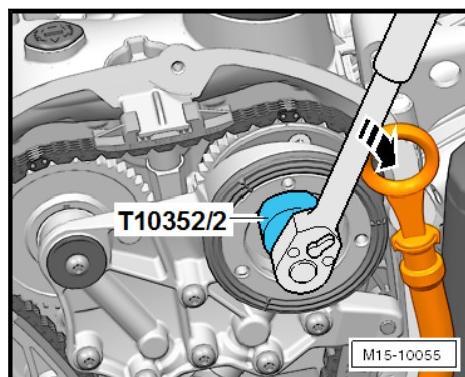


- The markings -1- on the camshaft chain sprockets must be opposite the markings -2 and 3-.
- The notch on the vibration damper and the marking on the lower timing chain cover -arrow- must be align.
- Remove the lower timing chain cover. Refer to [T2.2.2 Timing Chain Cover, Removing and Installing](#), page 129 .

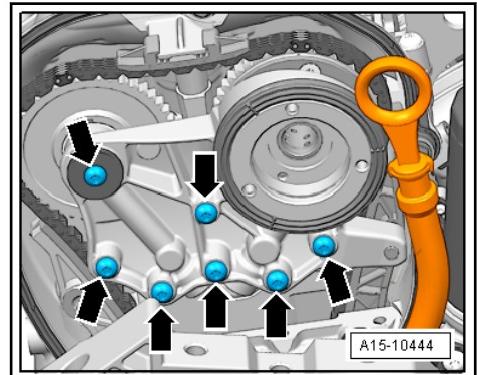


The control valve has left-hand thread.

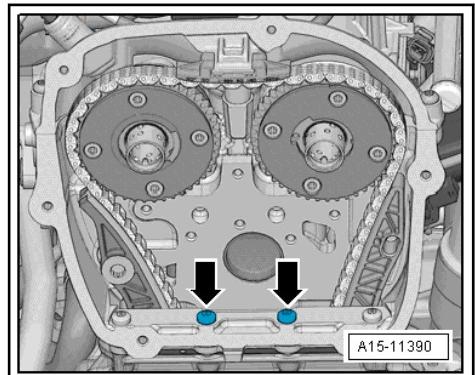
- Remove the control valve in the direction of the -arrow- using the -T10352/2-.



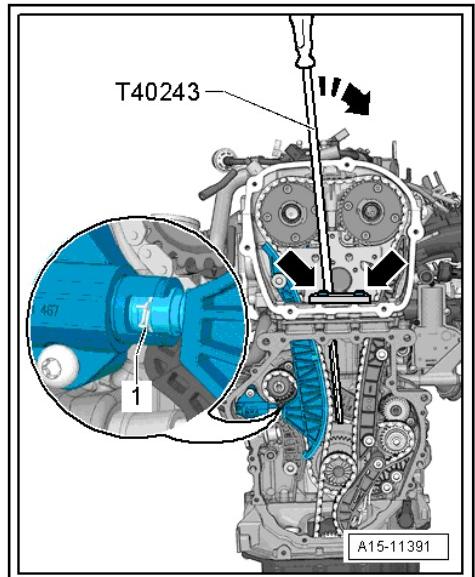
- Remove the bolts -arrows- and remove the bearing bracket.



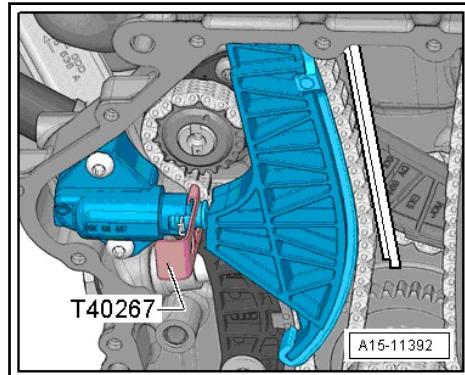
- Remove the bolts -arrows-.



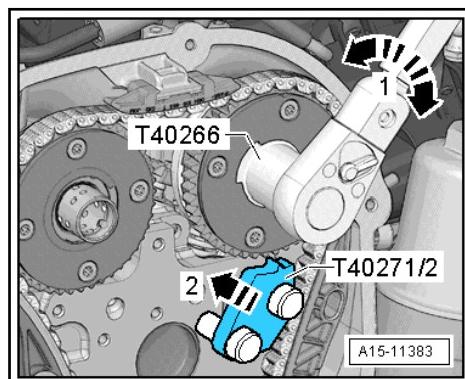
- Install the -T40243- -arrows-.



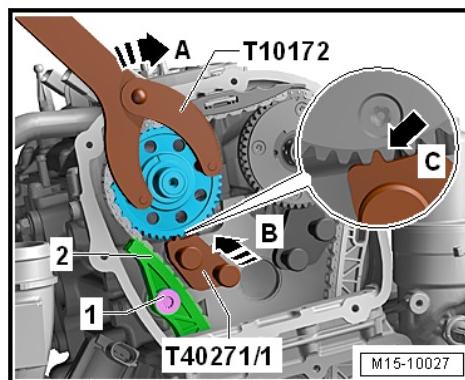
- Press the chain tensioner circlip -1- together and hold it.
- Slowly press and hold the -T40243- in the direction of -arrow-.
- Secure the chain tensioner with the -T40267-.



- Remove the -T40243-.
- Bolt the -T40271/2- to the cylinder head and slide into the splines on the chain sprocket in the direction of the -arrow 2-. Rotate the intake camshaft with the -T40266- in direction of -arrows 1- if necessary.

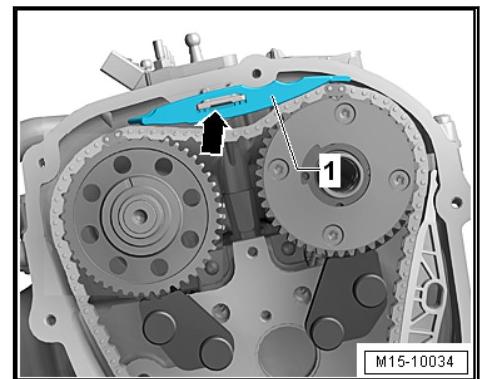


- Install the -T40271/1- on the cylinder head.

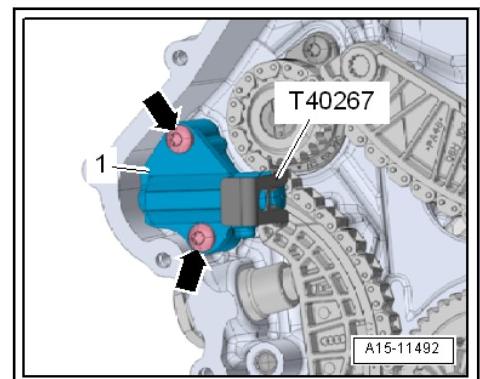


A second technician is necessary for the following step.

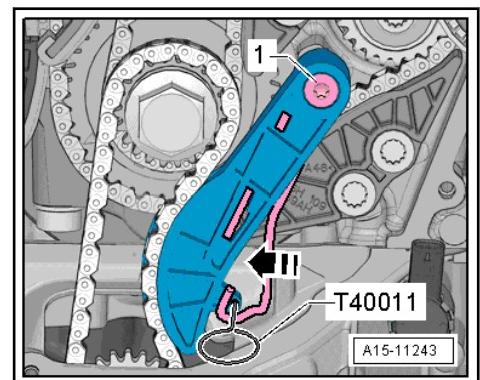
- Hold the exhaust camshaft securely with the -T10172A- in direction of the -arrow A-. Remove the bolt -1- and guide the tensioning rail -2- downward. Turn the camshaft clockwise until the -T40271/1- in the direction of the -arrow B- can be pushed in the chain sprocket splines -C-.
- Remove the guide rail -1-. To do so, release the retainer -arrow- with a screwdriver and push the guide rail off toward the front.



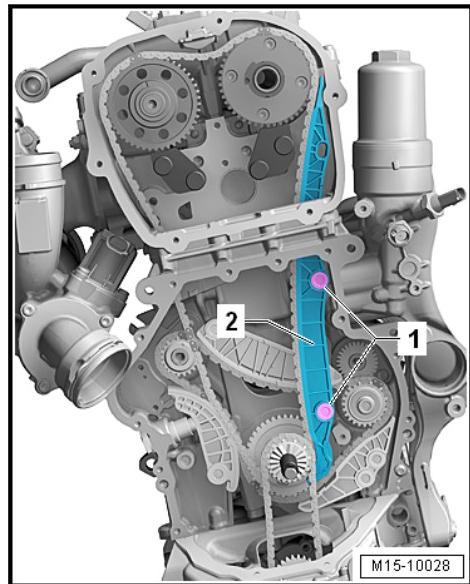
- Remove the bolts -arrows- and remove the chain tensioner -1-.



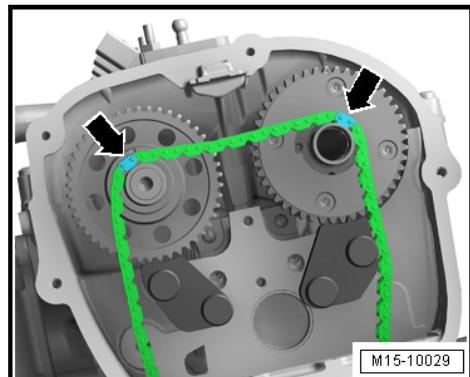
- Press the oil pump chain tensioner bracket in direction of -arrow- and lock with -T40011-.



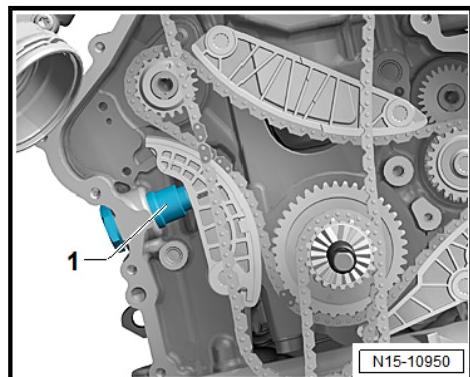
- Remove the bolt -1- and remove the chain tensioner.
- Remove the bolts -1- and remove the glide rail -2-.



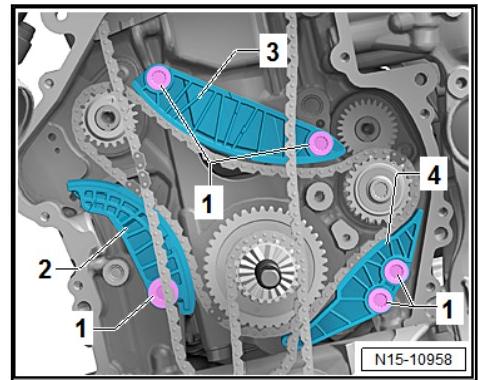
- Remove the camshaft timing chain from the camshaft sprockets and hang it on the camshaft pins -arrows-.



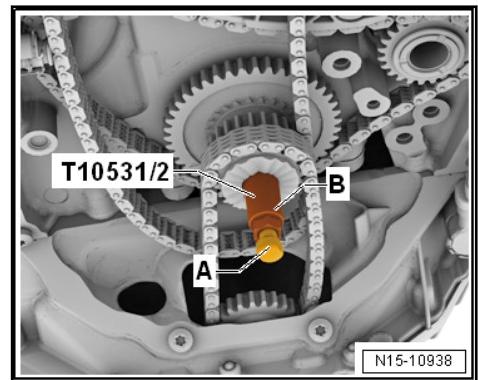
- Remove the chain tensioner -1- for the balance shaft timing chain.



- Remove the bolts -1-. Remove the tensioning rail -2- and the glide rails -3 and 4-.

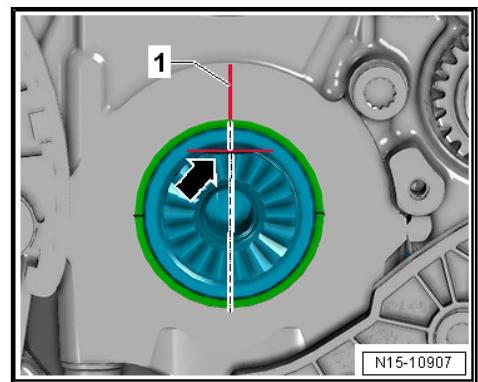


- Loosen the adjusting bolt -A- and remove the tensioning pin -B-.

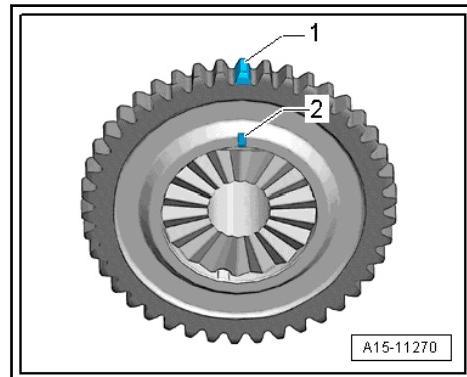


- Remove the oil pump drive timing chain to remove the three stage chain sprocket.
- Remove the camshaft timing chain and drive chain for the balance shaft.

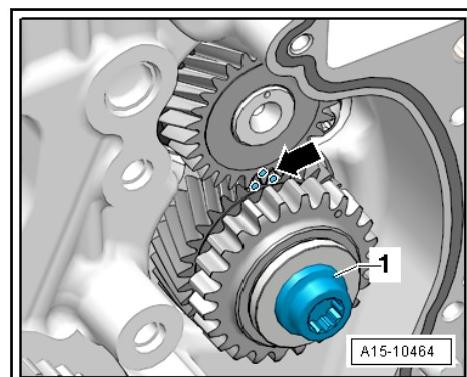
Installing



- Check the crankshaft at TDC. The flat area on the crank-shaft -arrow- must be horizontal.
- Draw the markings on the cylinder block -1-, as shown, with a waterproof marker.
- Draw a marking -2- on the three stage chain sprocket tooth -1- with a waterproof marker.

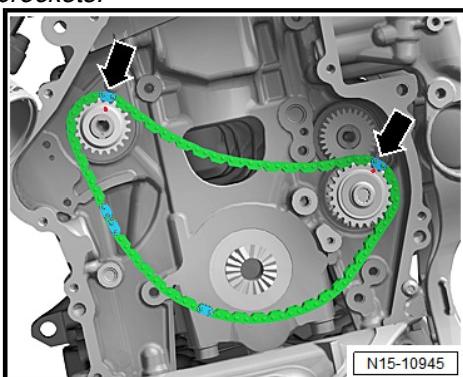


- Turn the intermediate sprocket and balance shaft to the marks -arrow-, but do not loosen the bolt -1-.



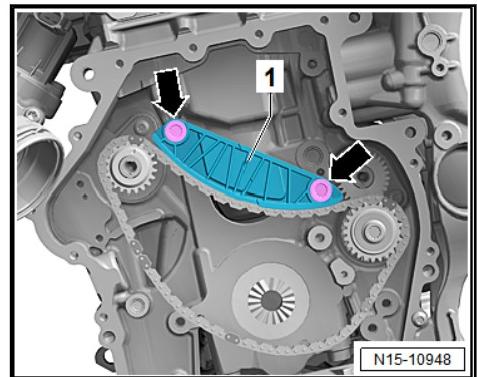
Note

The painted links of the drive chain must be positioned on the markings on the chain sprockets.

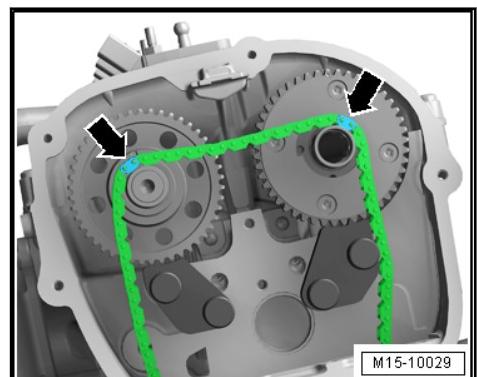


Ignore the position of any additional painted chain links that may also be present.

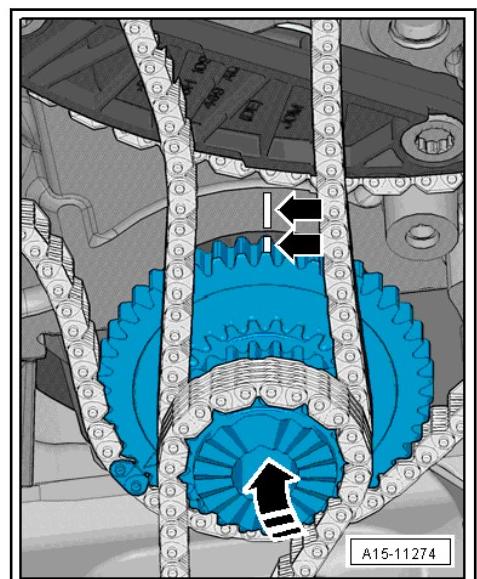
- Lay the balance shaft drive chain, the painted links -arrows- must be positioned with the markings on the chain sprockets.
- Install the guide rail -1- and tighten the bolts -arrows-.



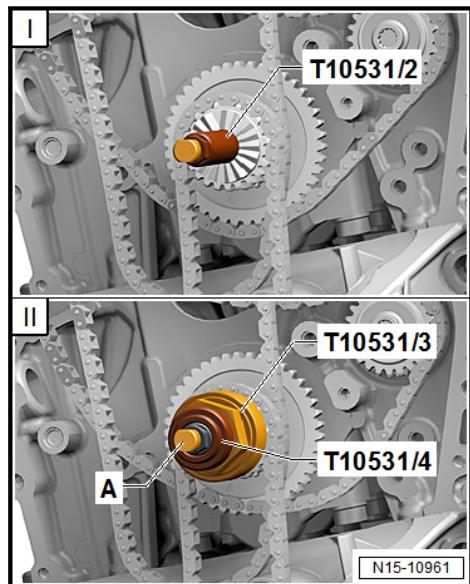
- Hook the camshaft timing chain with the marks -arrows- onto the camshaft pins.



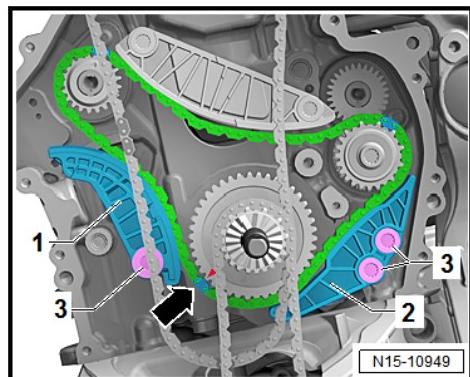
- Lay the oil pump drive timing chain onto the three stage chain sprocket.
- Tilt the three stage chain sprocket in the direction of the -arrow- toward the engine and secure it to the crankshaft. The marks -arrows- must be positioned opposite each other.



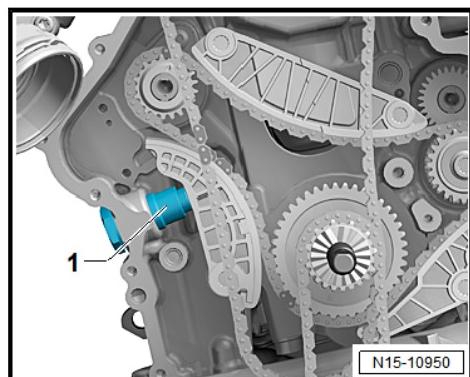
1. Install the -T10531/2- in the crankshaft and tighten hand-tight.



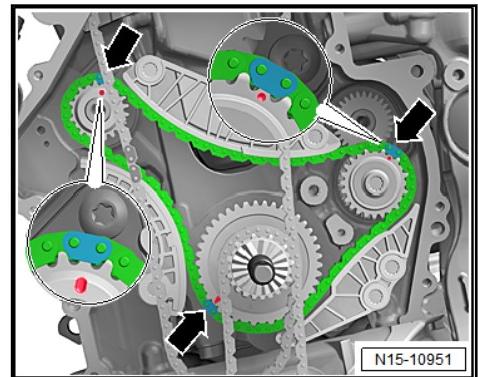
2. Install the -T10531/3-. Tighten the -T10531/4- hand-tight. Using a 32 mm open end wrench move the -T10531/3- back and forth slightly while doing this tighten the -T10531/4- until the chain sprocket is seated securely on the crankshaft splines. Now tighten the adjusting bolt -A-.
 - Position the painted chain link in the balance shaft drive chain -arrow- at the mark on the three stage chain sprocket. Install the tensioning rail -1- and the glide rail -2-. Tighten the bolts -3-.



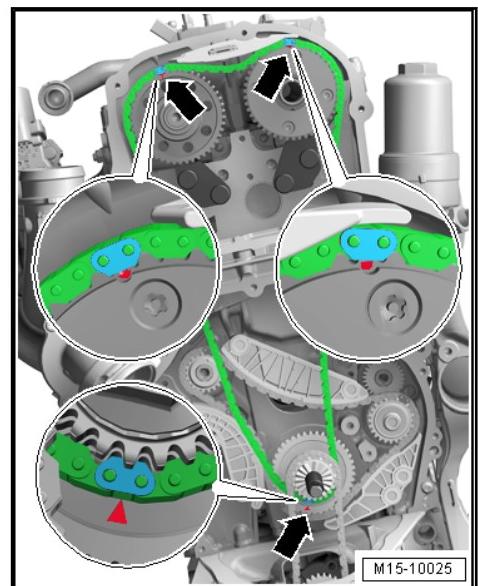
- Install the chain tensioner -1-.



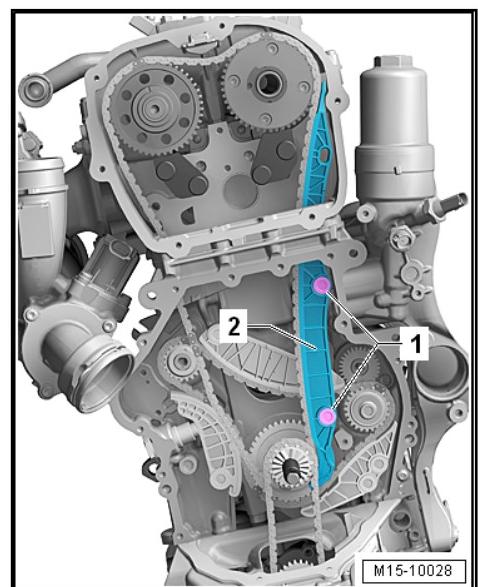
- Check the adjustment again. The painted chain links -arrows- must line up with the markings on the chain sprockets.



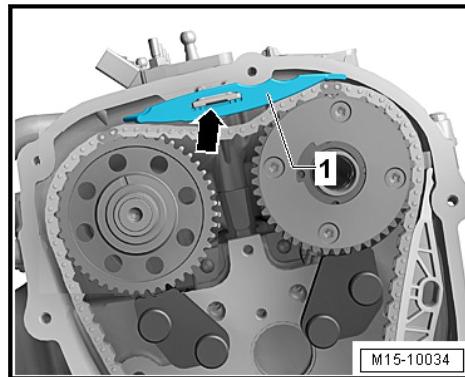
- Place the camshaft timing chain on the intake camshaft, exhaust camshaft and the crankshaft. Position the painted chain links -arrows- on the markings on the chain sprockets.



- Install the guide rail -2- and tighten the bolts -1-.

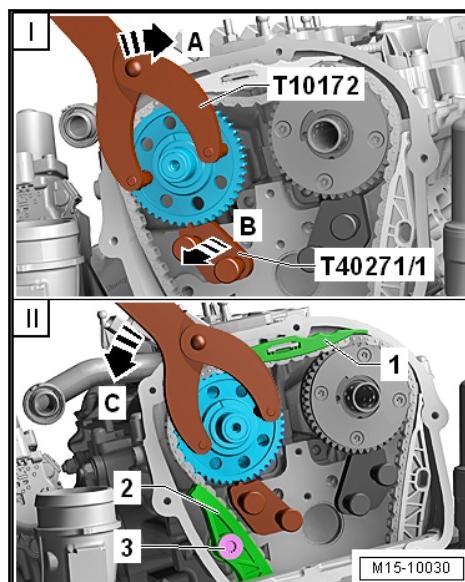


- Install the upper glide rail -arrow-.

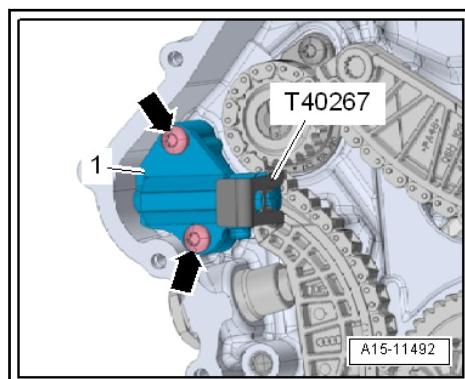


A second technician is necessary for the following step.

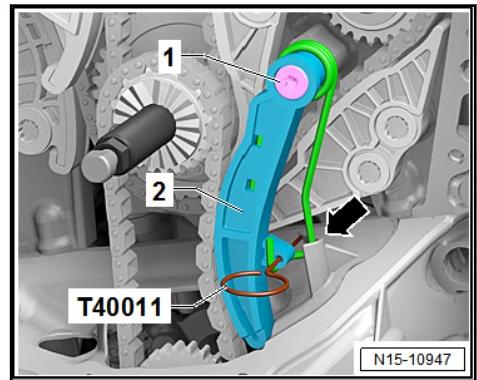
- Turn the exhaust camshaft slightly in the direction of the -arrow A- using the -T10172- and push the -T40271/1- out of the chain sprocket splines in the direction of the -arrow B-. Release the camshaft in the direction of -arrow C-, until the timing chain touches the glide rail -1-. Hold the camshaft firmly in this position, install the tensioning rail -2- and tighten the bolt -3-.



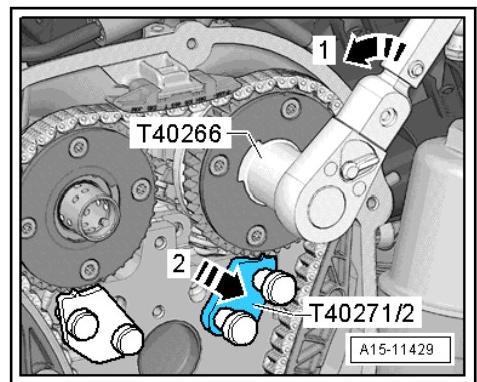
- Install the chain tensioner -1- and tighten the bolts -arrows-.



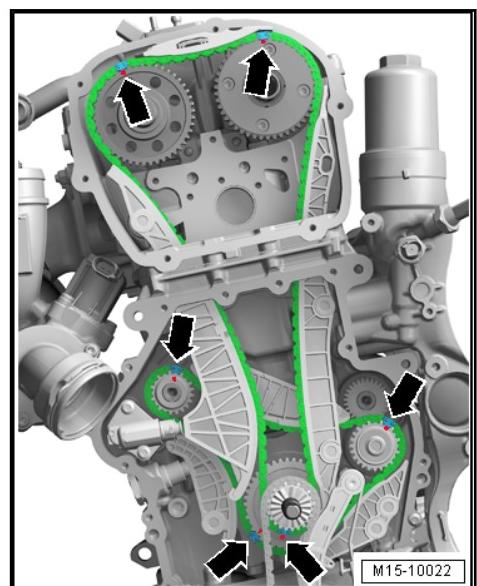
- Install the chain tensioner -2-. The wire clip -arrow- must come in to contact with the oil pan upper section opening. Tighten the bolt -1- and remove the -T40011-.



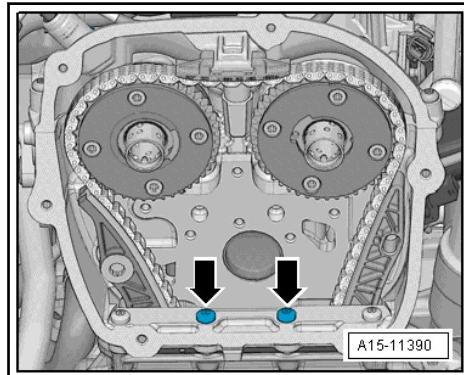
- Turn the intake camshaft in the direction of the -arrow 1- using the -T40266-. Slide the - T40271/2- out of the chain sprocket splines in direction of -arrow 2- and release the camshaft.



- Remove the -T40271/1- and -T40271/2-.
- Check the adjustment. The painted chain links -arrows- must line up with the markings on the chain sprockets.



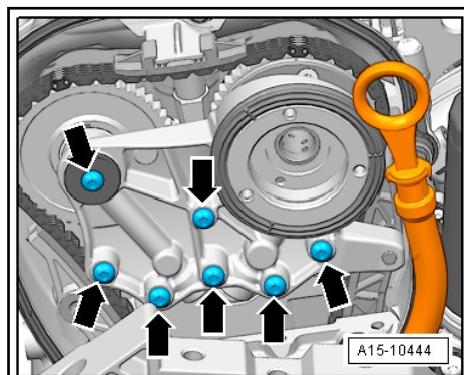
- Install the bolts -arrows- and tighten them. Tightening specification -item 4- [⇒ Item 4 \(page 111\)](#) .



A15-11390

Vehicles without Adapter Sleeve

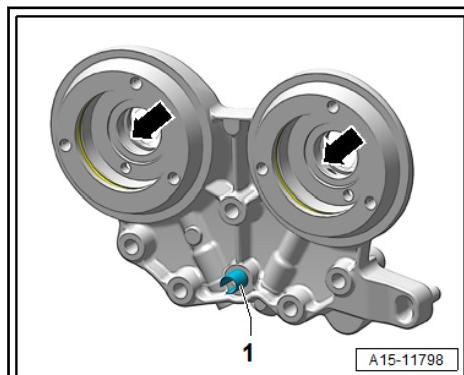
- Mount the bearing bracket and the bolts -arrows- hand-tight.



A15-10444

Vehicles with Adapter Sleeve

- Coat the holes -arrows- with engine oil.



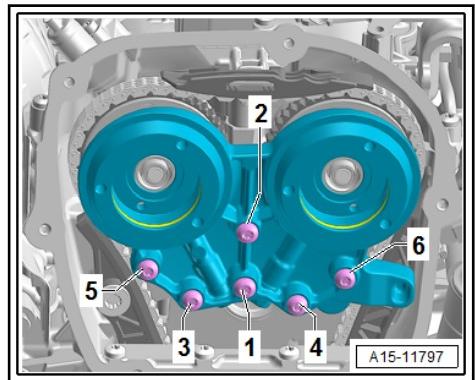
A15-11798



Note

The adapter sleeve -1- is not present on every bearing bracket.

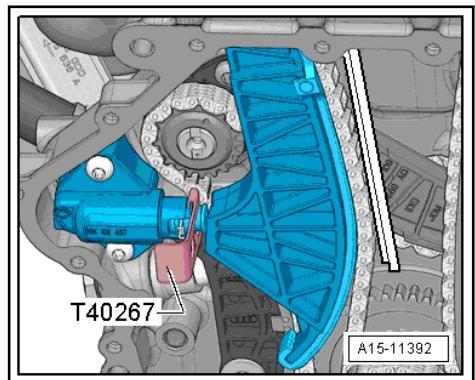
- Attach the bearing mount. Do not tilt it when doing this.
Tighten the bolts -1 to 6- hand-tight.



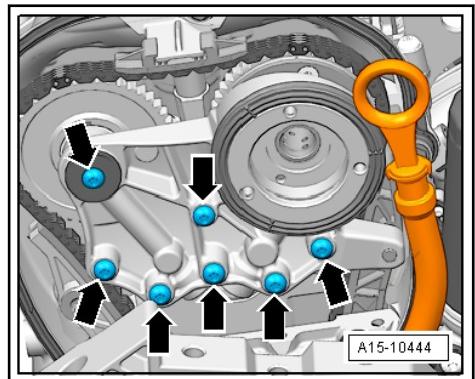
- If an adapter sleeve is installed, this will be moved with the bolt -1- in the cylinder head.

Continuation for All Vehicles

- Remove the -T40267-.



- Tighten the bolts -arrows-. Refer to [-3.1 Camshaft Timing Chains](#), page 138 .



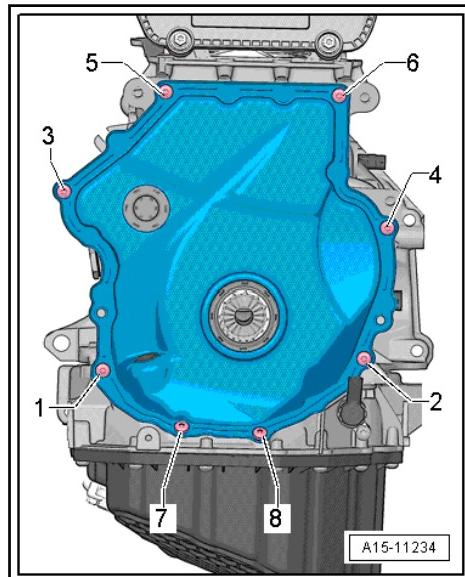
- Install the control valve -item 6- [Item 6 \(page 139\)](#) .
- Turn the engine twice in the direction of engine rotation.



Note

Due to the ratio, the painted chain links no longer match up after the engine has been turned.

- Remove the turning over tool and install the lower timing chain cover. Refer to [T2.2.2 iming Chain Cover, Removing and Installing](#), page 129 .



Note

Tighten the bolts -1 and 4- with an additional turn after installing the vibration damper. The bolts must be removed again to install the vibration damper.

- Install the vibration damper. Refer to [D1.4 amper, Removing and Installing](#), page 51 .
- Install the upper timing chain cover. Refer to [T2.2.1 iming Chain Cover, Removing and Installing](#), page 127 .
- Install the ribbed belt tensioner. Refer to [B1.3 elt Tensioner, Removing and Installing](#), page 51 .
- Install the ribbed belt. Refer to [B1.2 elt, Removing and Installing](#), page 49 .

Further installation is performed in reverse order of removal, while noting the following:

- After performing work on the chain drive the adaptation value in the engine control module must be adapted. To do so, turn on the ignition and select the following menu items on the Vehicle Diagnostic Tester:
 - ◆ 01 - Engine electronics
 - ◆ Guided Functions
 - ◆ 01 - Adaptation after repair work on the chain drive

Tightening Specifications

- ◆ Refer to [-3.1 Camshaft Timing Chains](#), page 138
- ◆ Refer to [-3.2 Balance Shaft Drive Chain](#), page 142
- ◆ Refer to [Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation](#).

3.4 Balance Shaft Drive Chain, Removing and Installing

The procedure "Balance shaft drive chain removing and installing" is in the "Camshaft timing chain removing and installing"

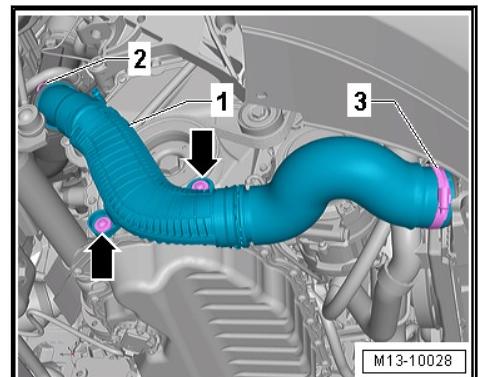


procedure. Refer to [⇒ T3.3 Timing Chain, Removing and Installing](#), page 145 .

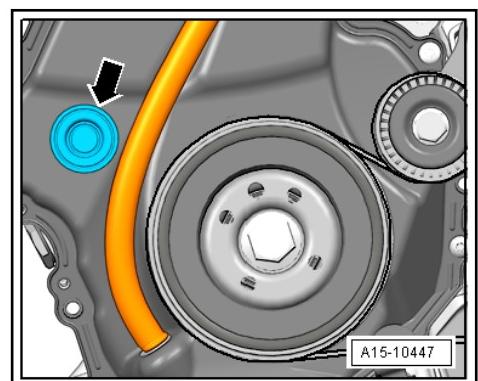
3.5 Timing Chain, Checking

Procedure

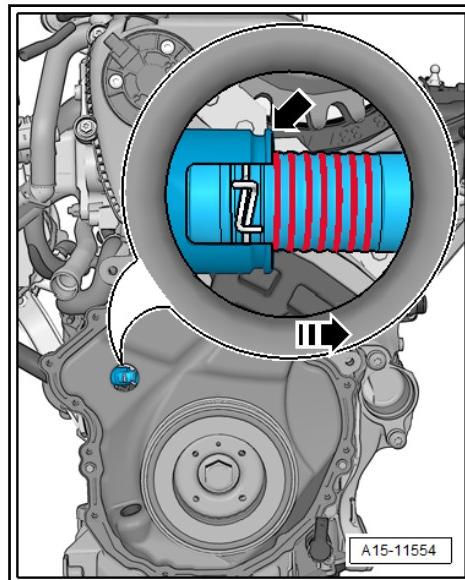
- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Remove the right front wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing.
- Remove the bolts -arrows-.



- Remove the air duct pipe by lifting the clip -2- and opening the screw-type clamp -3-.
- Remove the plug -arrow-. The plugs must be replaced.



- Turn the vibration damper in direction of engine rotation until the chain tensioner piston is extended the maximum distance in the direction of -arrow-.



- Count the visible piston splines.

 **Note**

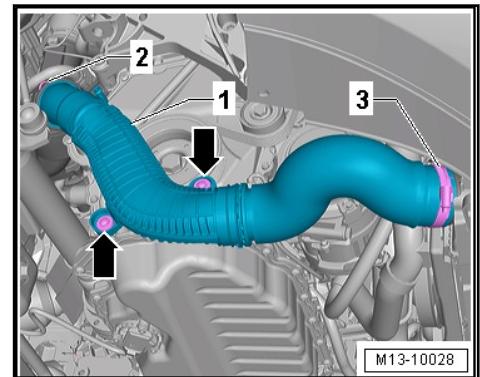
The visible splines are all of the splines that are located to the right of the chain tensioner housing -arrow-.

- ◆ If six or fewer threads are visible: adjust the chain length by selecting [01 – Chain Length Adaptation Diagnosis](#) in [Guided Functions](#) on the vehicle diagnostic tester. Then erase the DTC memory.
- ◆ If seven or more threads are visible: replace the camshaft timing chain. Refer to [⇒ R4.2 removing and Installing](#), page [167](#).

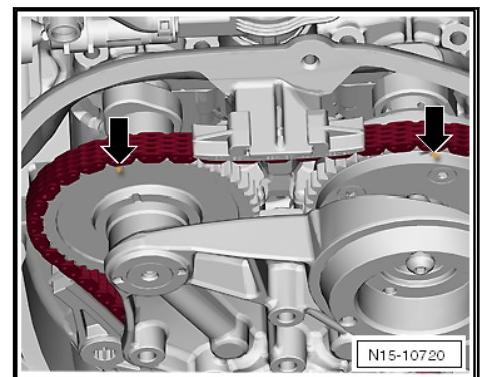
3.6 Valve Timing, Checking

Special tools and workshop equipment required

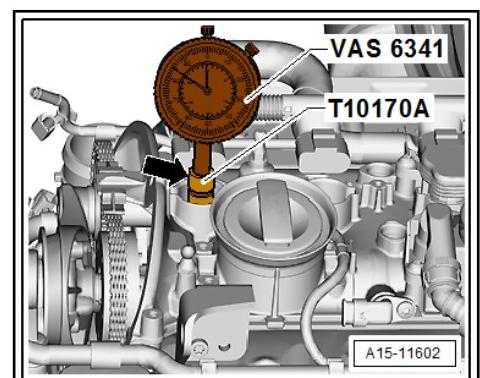
- ◆ Dial Gauge Set -VAS6341-
- ◆ Dial Gauge Adapter -T10170A-
- Remove the upper timing chain cover. Refer to [⇒ T2.2.1 iming Chain Cover, Removing and Installing](#), page [127](#).
- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Remove the right wheel and the right wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing.
- Remove the bolts -arrows-.



- Remove the air duct pipe by lifting the clip -2- and opening the screw-type clamp -3-.
- Turn the crankshaft with the - SW24-on the vibration damper in the direction of the engine rotation until the markings -arrows- are almost on top.



- Remove the spark plug from cylinder 1.
- Install the -T10170/A- all the way into the spark plug thread.

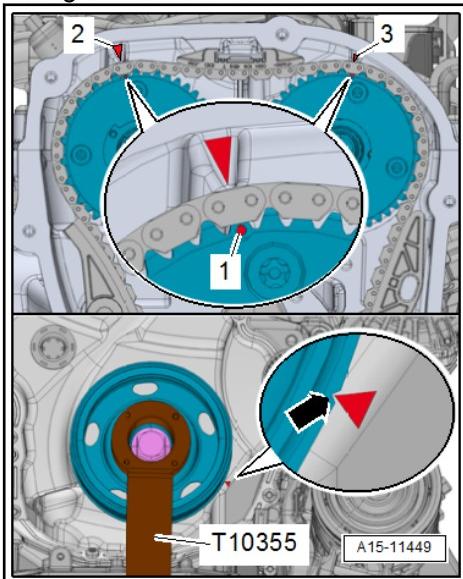


- Insert the -VAS6341- using the -T10170A/1- until stop and secure with the locking nut -arrow-.
- Turn the crankshaft slowly in the direction of the engine rotation until the maximum dial reading is reached. When the maximum dial reading is reached (BDC of the meter) position the piston at »TDC«.



Note

- ◆ Use a ratchet with a 24 mm socket to turn the vibration damper.
- ◆ If the crankshaft was turned past "TDC", turn the crankshaft two more turns in the direction of the engine rotation. Do not turn the engine in the opposite direction of the engine rotation.
- The notch on the vibration damper must align with the arrow marking on the lower timing chain cover -arrow-.



- The markings -1- on the camshaft chain sprockets must be opposite the markings -2 and 3- on the cylinder head.



4 Valvetrain

[⇒ 4.1 Valvetrain", page 165](#)

[⇒ R4.2 emoving and Installing", page 167](#)

[⇒ C4.3 amshaft Adjustment Valve 1N205, Removing and Instal-
ling", page 185](#)

[⇒ S4.4 tem Seals, Removing and Installing", page 185](#)

4.1 Overview - Valvetrain

Note

- ◆ *The cylinder head and the cylinder head cover must be replaced together.*
- ◆ *Do not start the engine for approximately 30 minutes after installing the camshafts. The hydraulic adjusters must seat themselves (otherwise the valves will crash into the pistons).*
- ◆ *After working on the valvetrain and lifters, carefully rotate the crankshaft by hand at least two full revolutions to be sure that valves do not strike the pistons when starting.*
- ◆ *Always replace gaskets and seals.*
- ◆ *After performing work on the chain drive the adaptation value in the engine control module must be adapted. To do so, turn on the ignition and select the following menu items on the Vehicle Diagnostic Tester:*
- ◆ [01 – Engine electronics](#)
- ◆ [Guided Functions](#)
- ◆ [01 – Adaptation after repair work on the chain
drive](#)



1 - Exhaust Valve

- Do not rework, only lapping is permitted
- Valve Dimensions. Refer to [D5.3 dimensions](#), page 196 .
- Valve Guides, Checking. Refer to [G5.1 guides, Checking](#), page 195 .

2 - Cylinder Head

3 - Valve Stem Seal

- Replacing. Refer to [S4.4 stem Seals, Removing and Installing](#), page 185 .

4 - Valve Spring

5 - Valve Spring Retainer

6 - Valve Retainers

7 - Hydraulic Adjuster

- Do not interchange
- Lubricate contact surface

8 - Clip

- For hydraulic adjuster

9 - Roller Rocker Lever

- Removing and installing. Refer to [R4.2 removing and Installing](#), page 167 .
- Mark the installed position for installation later
- Check the roller bearing for ease of movement
- Lubricate the running surfaces before installing

10 - Exhaust Camshaft

- Removing and installing. Refer to [R4.2 removing and Installing](#), page 167 .
- Check radial clearance using Plastigauge® (roller rocker lever removed)
- Radial clearance: 0.024 to 0.066 mm
- Run-out: maximum 0.04 mm

11 - Cylinder Head Cover

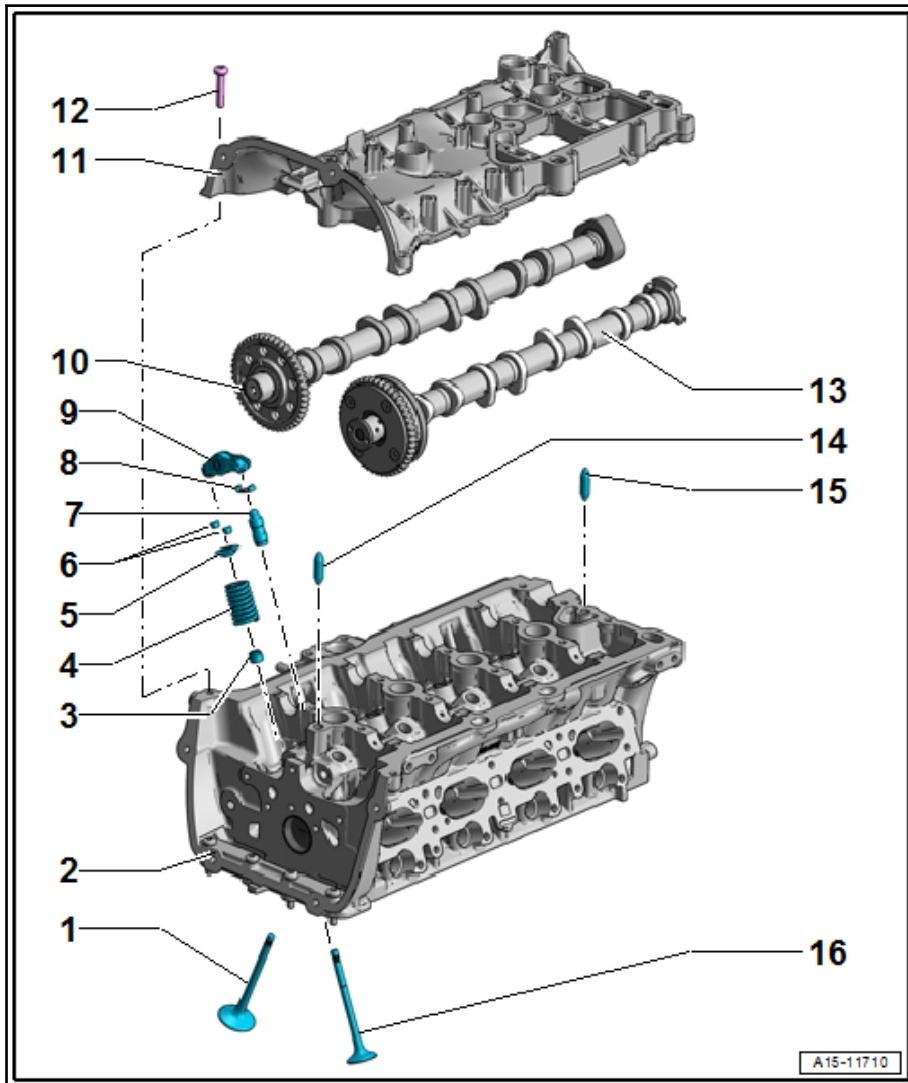
- With integrated camshaft bearings
- Clean sealing surface, reworking is not permitted.
- Remove old sealant residue.

12 - Bolt

- Replace after removing
- Loosening. Refer to [Fig. "Loosening the Cylinder Head Cover"](#), page 167
- Tightening sequence. Refer to [Fig. "Cylinder Head Cover, Tightening Specifications and Sequence"](#), page 167

13 - Intake Camshaft

- Removing and installing. Refer to [R4.2 removing and Installing](#), page 167 .
- Check radial clearance using Plastigauge® (roller rocker lever removed)



A15-11710



- Radial clearance: 0.024 to 0.066 mm
- Run-out: maximum 0.04 mm

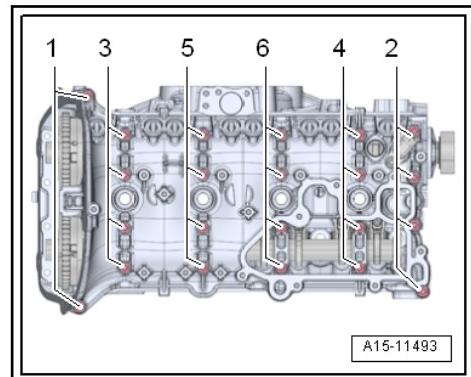
14 - Alignment Pin

15 - Alignment Pin

16 - Intake Valve

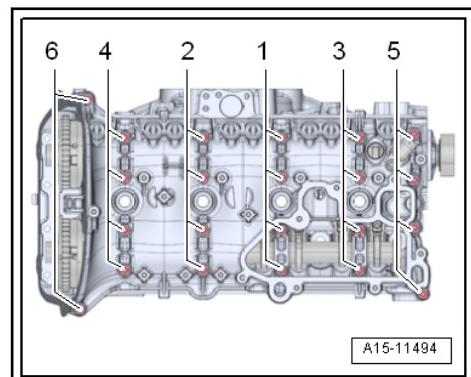
- Do not rework, only lapping is permitted
- Valve Dimensions. Refer to [D5.3 imensions](#), page 196 .
- Valve Guides, Checking. Refer to [G5.1 uides, Checking](#), page 195 .

Loosening the Cylinder Head Cover



- Loosen the cylinder head cover in the sequence
-1 through 6-.

Cylinder Head Cover, Tightening Specifications and Sequence



- Replace the bolts.

Step	Bolts	Tightening Specification/Additional Turn
1.	-1 through 6-	Install hand-tight in several stages
2.	-1 through 6-	8 Nm
3.	-1 through 6-	Turn an additional 90°.

4.2 Camshaft, Removing and Installing

Special tools and workshop equipment required

- ◆ Central Valve Assembly Tool -T10352-
- ◆ Counterhold - Vibration Damper -T10355-
- ◆ Chain Tensioner Lever -T40243-



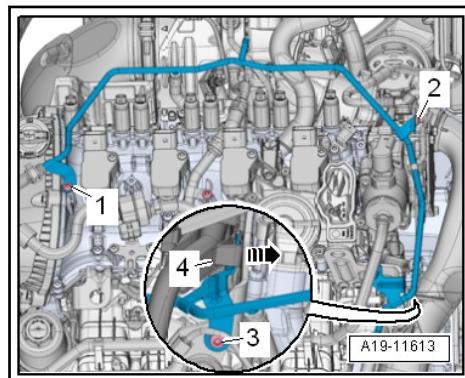
- ◆ Tensioner Locking Tool -T40267-
- ◆ Camshaft Locks -T40271-
- ◆ Adapter -T40266-
- ◆ Counterhold - Multiple Use -T10172A- with Counterhold - Kit
- Adapter 2 -T10172/9-

Removing



Note

- ◆ The sealing surfaces of the lower cylinder head cover and on the upper cylinder head must not be reworked.
- ◆ The camshaft bearings are integrated in the cylinder head or cylinder head cover. Before removing the cylinder head cover, release the tension on the camshaft timing chain.
- ◆ When installing, secure all cable ties back to same positions.
- Remove the air filter housing. Refer to [⇒ F3.2 ilter Housing, Removing and Installing](#), page 329 .
- Remove the upper coolant pipe. Refer to [⇒ C3.3 oolant Pipes, Removing and Installing](#), page 265 .
- Remove the ignition coils. Refer to [⇒ C1.3 oils with Power Output Stages, Removing and Installing](#), page 386 .
- Free up the connector from the clip -4- and pivot it forward.

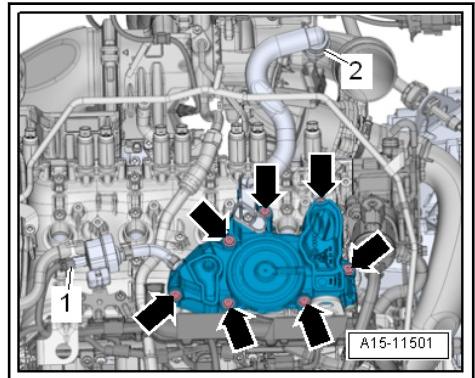


- Release the retainers in direction of -arrow-, remove the wiring duct upward from the bracket and move it towards the front.
- Remove bolts -1, 2 and 3-. Carefully swing coolant line backward slightly.



Note

- ◆ Risk of destroying the coolant pipes through deformation.
- ◆ Never change the coolant pipe bend shape.
- Disconnect the connector -1- from the EVAP Canister Purge Regulator Valve 1 -N80-.
- Press the release button on the crankcase ventilation hose -2- and remove the hose.
- Remove the bolts -arrows- and the crankcase ventilation.



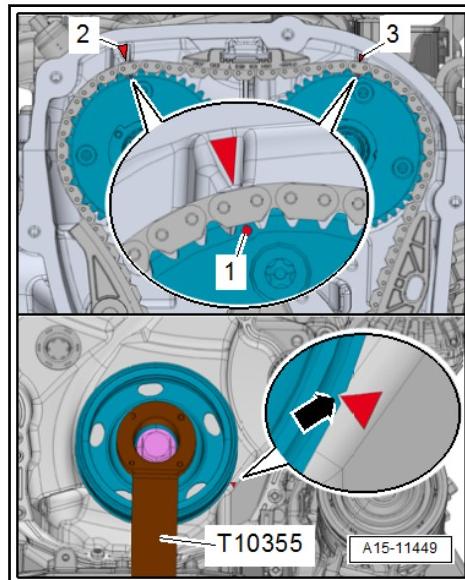
- Remove the high pressure pump. Refer to [P7.2 pressure Pump, Removing and Installing](#), page 357 .
- Remove the vacuum pump. Refer to [P1.4 pump, Removing and Installing](#), page 120 .
- Support the engine in the installation position. Refer to [S2.5 supporting in Installation Position](#), page 32 .
- Remove the engine mount. Refer to [M2.2 mount, Removing and Installing](#), page 29 .
- Remove the noise insulation. Refer to [Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation](#).
- Remove the right wheel housing liner. Refer to [Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing](#).
- Remove the engine support. Refer to [S1.6 support, Removing and Installing](#), page 62 .
- Remove the upper timing chain cover. Refer to [T2.2.1 Timing Chain Cover, Removing and Installing](#), page 127 .



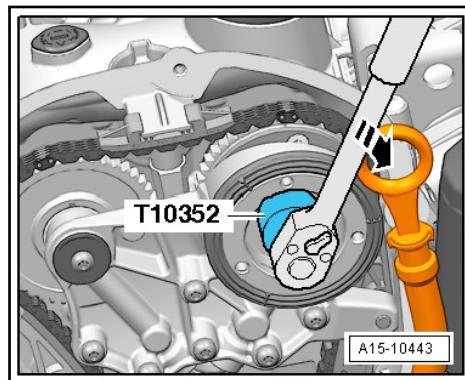
Note

To prevent damage from escaping coolant on the oil pressure switch, cover with a cloth.

- Rotate the vibration damper using the -T10355- into the "TDC" position.



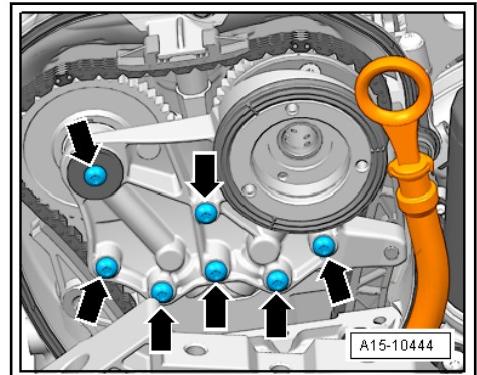
- The markings -1- on the camshaft chain sprockets must be opposite the markings -2 and 3-.
- The notch on the vibration damper and the marking on the lower cover for timing chain -arrow- must be opposite one another.
- Remove the lower timing chain cover. Refer to [T2.2.2 Timing Chain Cover, Removing and Installing](#), page [129](#).
- Remove the control valve in the direction of using the - T10352/-.



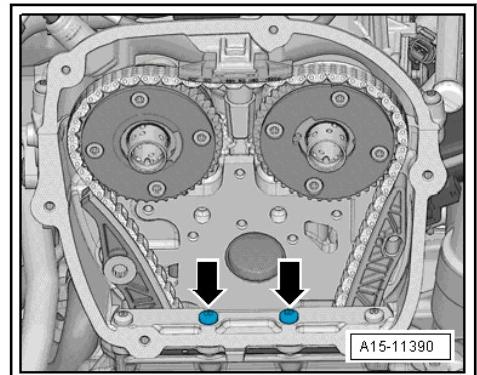
 Note

The control valve has left-hand thread.

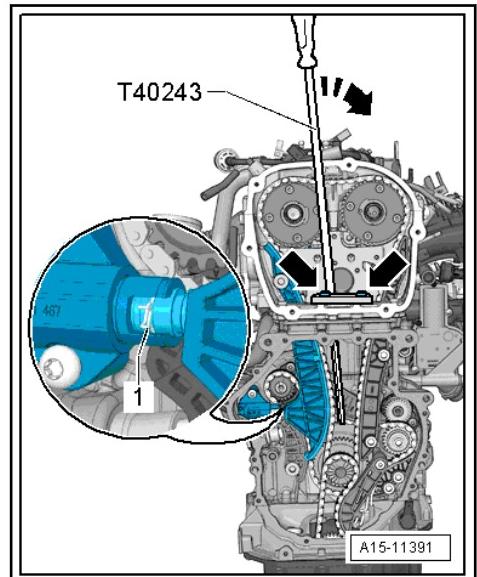
- Remove the bolts -arrows- and remove the bearing bracket.



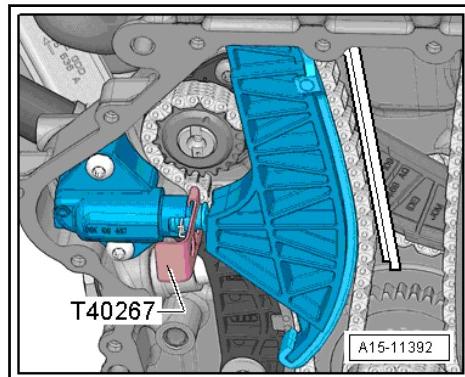
- Remove the bolts -arrows-.



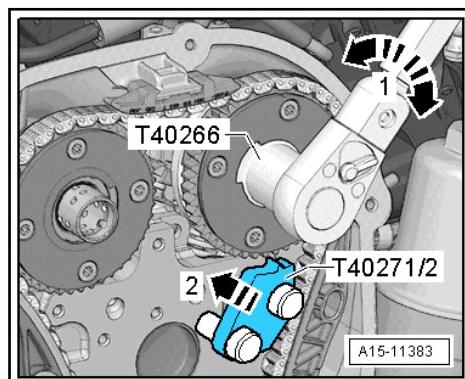
- Install the -T40243- -arrows-.
- Press the chain tensioner circlip -1- together and hold it.
- Slowly press and hold the -T40243- in the direction of -arrow-.



- Secure the chain tensioner with the -T40267-.



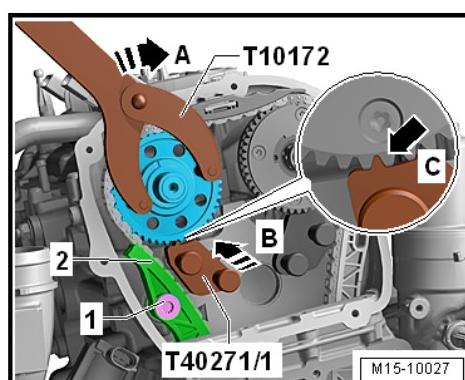
- Remove the -T40243-.
- Bolt the -T40271/2- to the cylinder head and slide into the splines on the chain sprocket in the direction of the -arrow 2-. Rotate the intake camshaft with the -T40266- -1- if necessary.



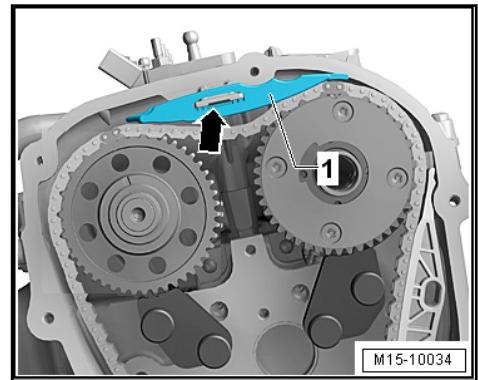
- Install the -T40271/1- on the cylinder head.

A second technician is needed for the following step.

- Hold the exhaust camshaft securely with the -T10172A- in direction of the -arrow A-. Remove the bolt -1- and guide the tensioning rail -2- downward. Turn the camshaft clockwise -A- until the -T40271/1- can be slid, in the direction of the -arrow B-, into the chain sprocket splines -C-
- Check the installation position -C- of the -T40271/1-.

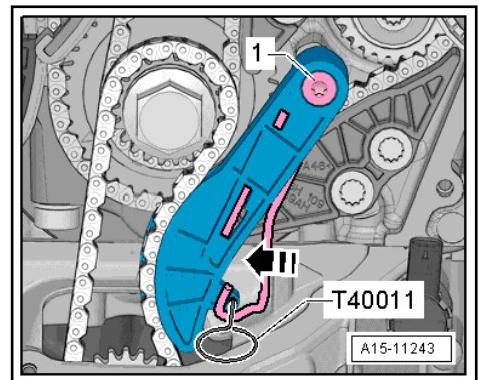


- Remove the guide rail -1-. To do so, release the retainer -arrow- with a screwdriver and push the guide rail off toward the front.



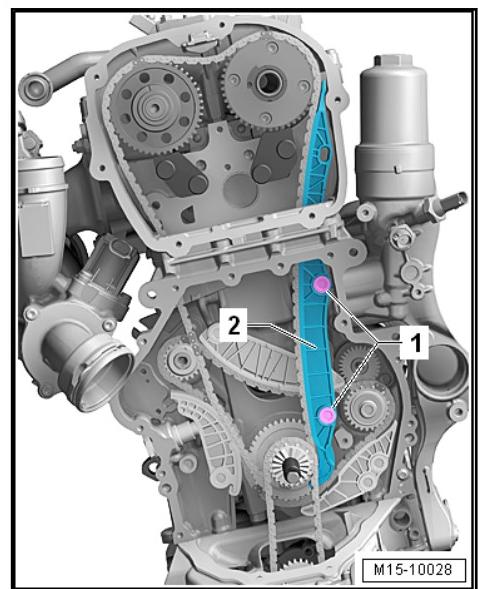
M15-10034

- Press the oil pump chain tensioner bracket in direction of -arrow- and lock with -T40011-.



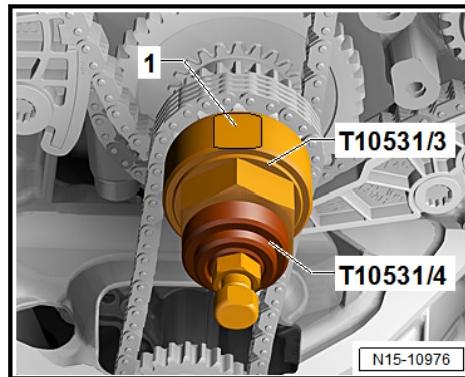
A15-11243

- Remove the bolt -1- and remove the chain tensioner.
- Remove the bolts -1- and remove the glide rail -2-.

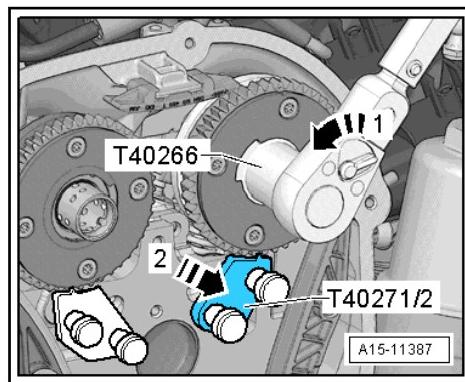


M15-10028

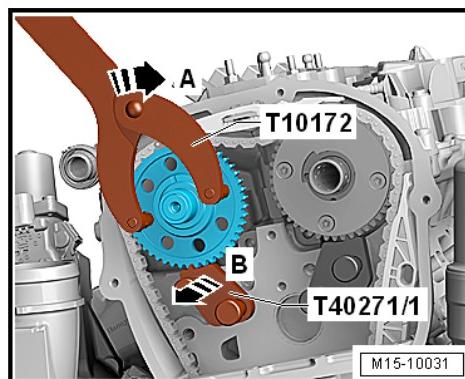
- Remove the camshaft timing chain from the camshaft bearing and guide downward.
- Install the -T10531/3-. In the “TDC point” the flat area -1- points upward. Install the -T10531/4-. Turn the crankshaft with a 32 mm open end wrench counter-clockwise out of “TDC”.



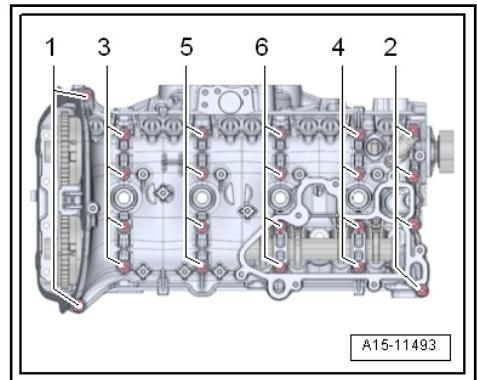
- Turn the intake camshaft in the direction of the -arrow 1- using the -T40266-. Slide the -T40271/2- out of the chain sprocket splines in direction of -arrow 2- and bring the cam-shaft into the rest position.



- Turn the exhaust camshaft using the -T10172A- in direction of the -arrow A-. Slide the -T40271/1- out of the chain sprocket splines in the direction of the -arrow B- and bring the camshaft into the rest position.



- Remove the cylinder head cover bolts in -1 to 6- sequence.



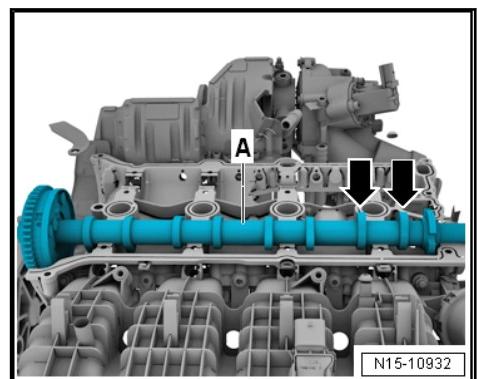
- Remove the cylinder head cover.
- Remove the camshaft and cover the open engine components.

Camshafts, Installing

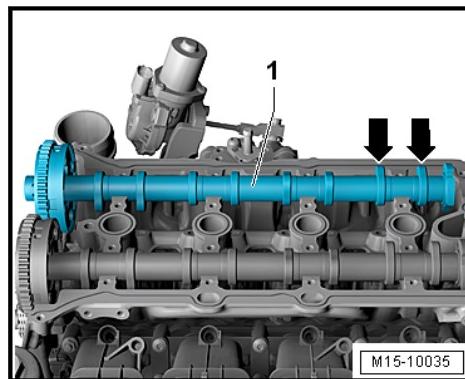


- ◆ *Sealing surfaces must be completely free of oil and grease.*
- ◆ *Pay attention that all roller rocker levers rest on the valve stem ends.*

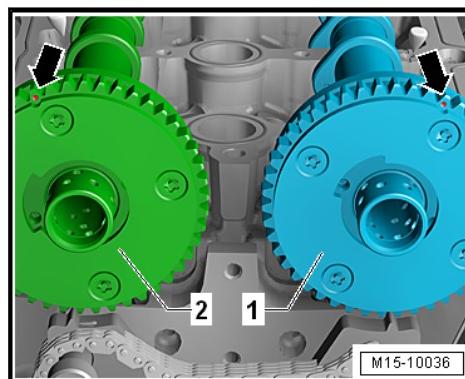
- If the crankshaft was turned in the meantime, bring the piston for cylinder 1 to TDC and then turn the crankshaft back again slightly.
- Remove any sealant residue from the groove on the cylinder head cover as well as on the sealing surfaces.
- Sealing surfaces must be free of oil and grease.
- Lubricate the running surfaces of both camshafts.
- Place the intake camshaft -A- in the cylinder head. Turn the cam lobes of cylinder 4 -arrows- upward.



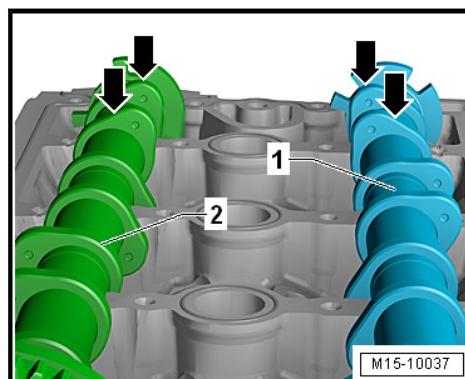
- Insert the exhaust camshaft -1- in the cylinder head cover. Turn the cam lobes of cylinder 4 -arrows- upward.



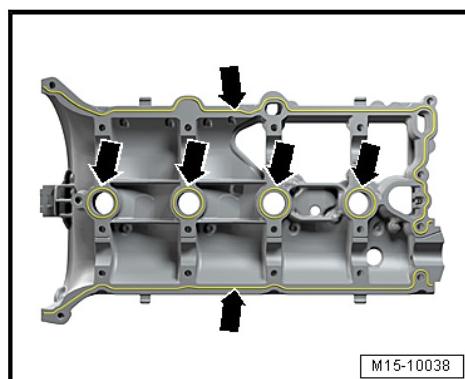
- Turn the intake camshaft -1- and the exhaust camshaft -2- until the markings -arrows- are in the -position shown-.



- The cams of the intake camshaft -1- and the exhaust camshaft -2- must point upward as shown -arrows-.



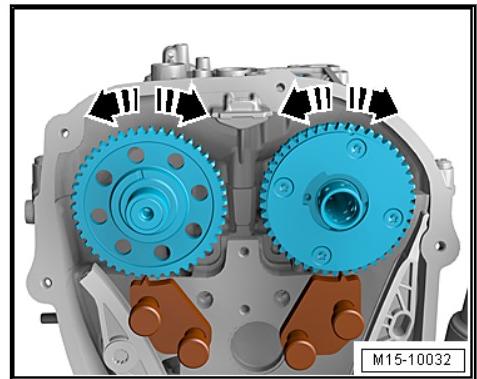
- Apply the sealant on the clean sealing surface of the cylinder head cover as illustrated -arrows-.



- ♦ Sealant bead thickness: 2 to 3 mm.



- Mount the cylinder head cover on the cylinder head.
- Lightly push on the cylinder head cover by hand and while doing so turn the camshaft slightly until the cylinder head cover lays »free of tension« on the cylinder head.



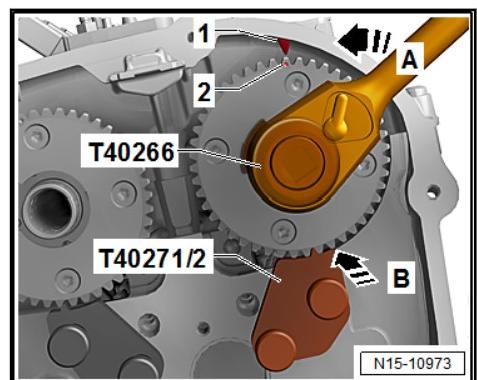
- Replace the cylinder head cover bolts.
- Tighten the bolts in several steps. Tightening sequence. Refer to [Fig. "Cylinder Head Cover, Tightening Specifications and Sequence"](#), page 167 .



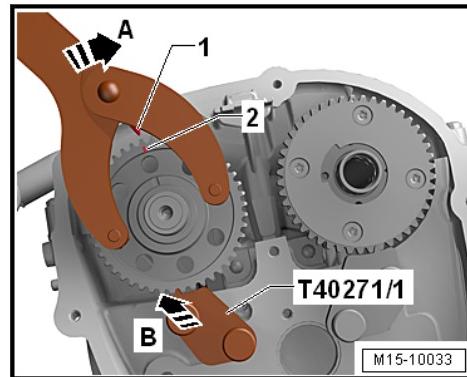
Note

Pay attention that the cylinder head cover is not tilted.

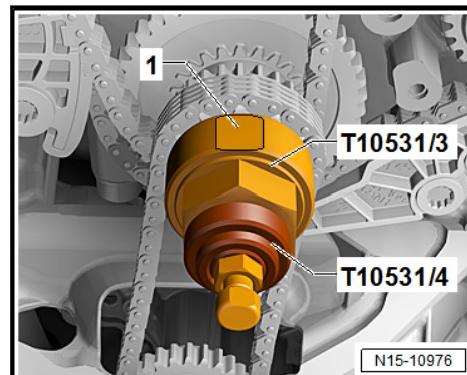
- Turn the intake camshaft with the -T40266- in the direction of the -arrow A- until the markings -1 and 2- align. Push the -T40271/2- in the chain sprocket splines in direction of -arrow B-.



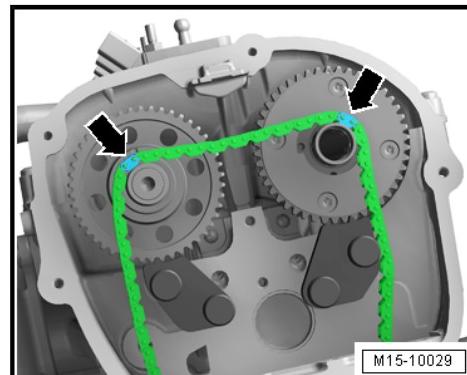
- Turn the exhaust camshaft using the -T10172A- in the direction of -arrow A- until the markings -1 and 2- align. Slide the - T40271/1- into the chain sprocket splines in direction of the -arrow B-. The mark -2- is offset slightly to the right.



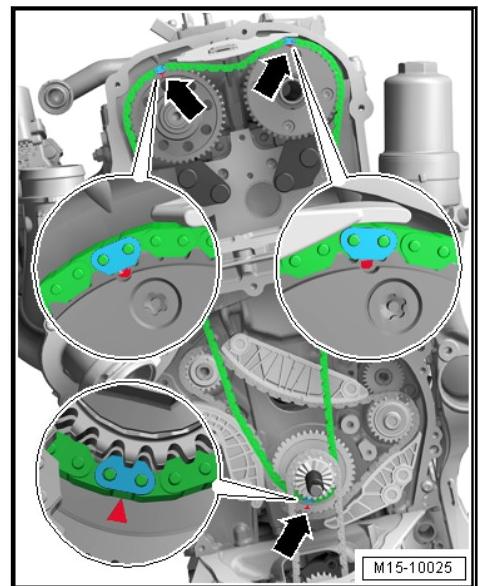
- Turn the crankshaft on the hex fitting to the “TDC point”. In the “TDC point” flat area -1- is upward.



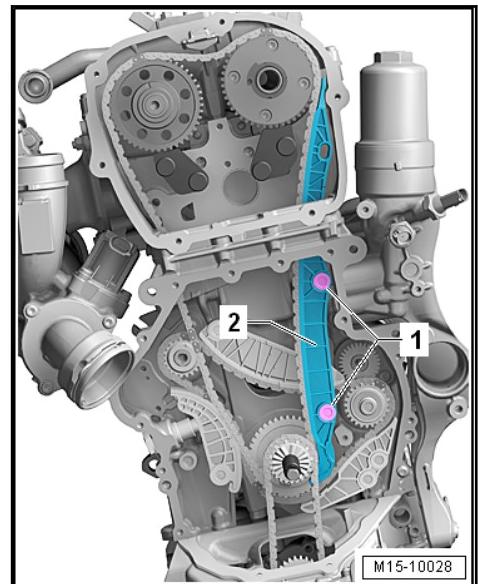
Install the Camshaft Timing Chain



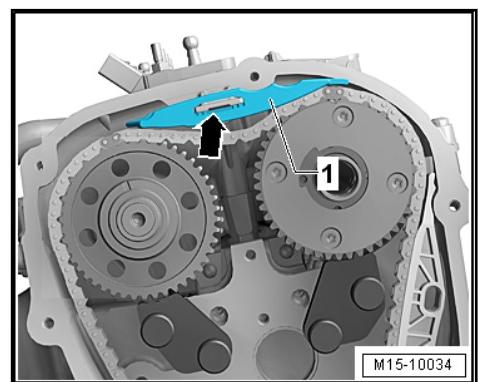
- Engage the camshaft timing chain with the painted links -arrows- on the camshaft pins.
- Place the camshaft timing chain on the intake camshaft, exhaust camshaft and the crankshaft. Position the painted chain links -arrows- on the markings on the chain sprockets.



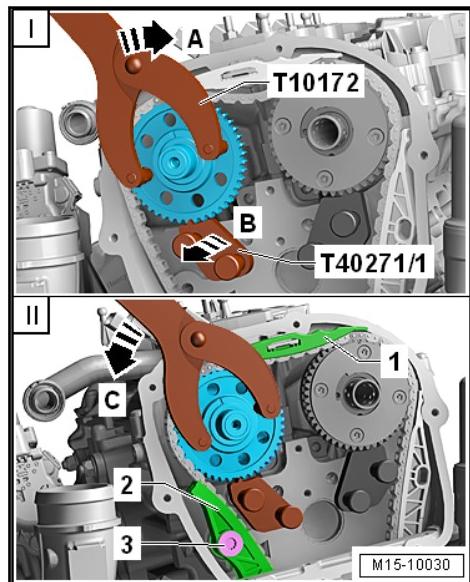
- Install the guide rail -2- and tighten the bolts -1-.



- Install the upper glide rail -1-.



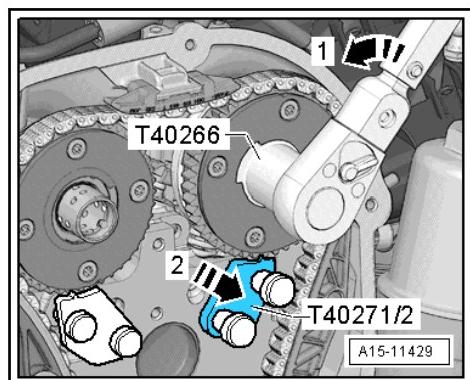
A second technician is needed for the following step.



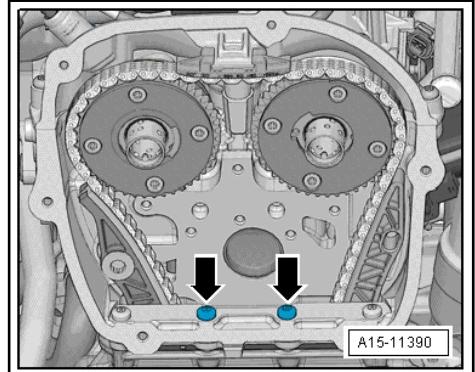
I - Turn the exhaust camshaft with the -T10172- slightly in the direction of the -arrow A- and pull the -T40271/1- out of the chain sprocket splines in direction of -arrow B-.

II - Release the camshaft in the direction of -arrow C-, until the timing chain touches the glide rail -1-. Hold the camshaft in this position, install the tensioning rail -2- and tighten the bolts -3-. Release the camshaft.

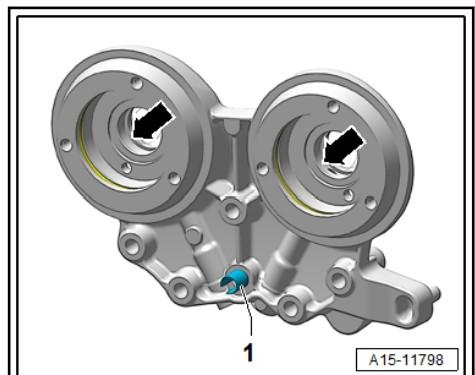
- Turn the intake camshaft with the -T40266- in the direction of the -arrow 1- until the -T40271/2- can be pushed out of the chain sprocket splines in the direction of the -arrow 2-. Release the camshaft.



- Remove the -T40271/1- and -T40271/2-.
- Install the bolts -arrows- and tighten them. Tightening specification: -item 4- [⇒ Item 4 \(page 111\)](#).



- Coat the holes -arrows- with engine oil.

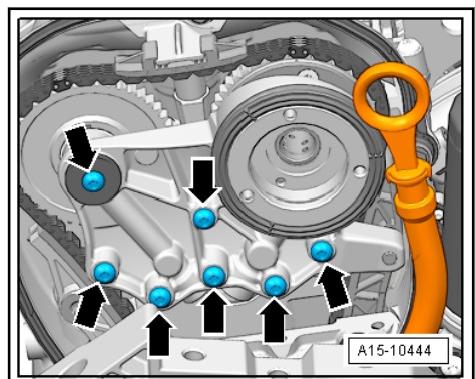


Note

Adapter sleeve -1- is not present on every bearing bracket.

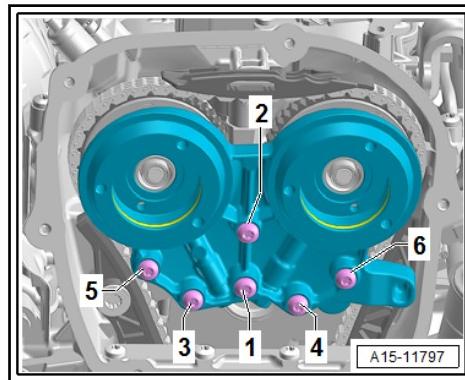
Vehicles without Adapter Sleeve

- Mount the bearing bracket and the bolts -arrows- hand-tight.



Vehicles with Adapter Sleeve

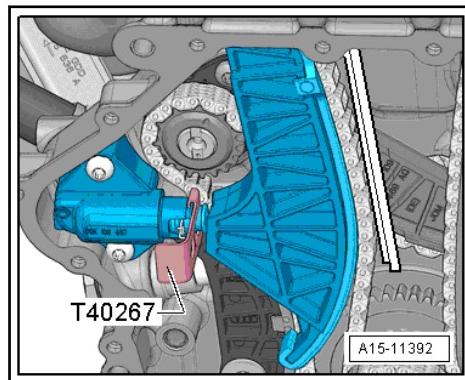
- Attach the bearing mount. Do not tilt it when doing this.
Tighten the bolts -1 to 6- hand-tight.



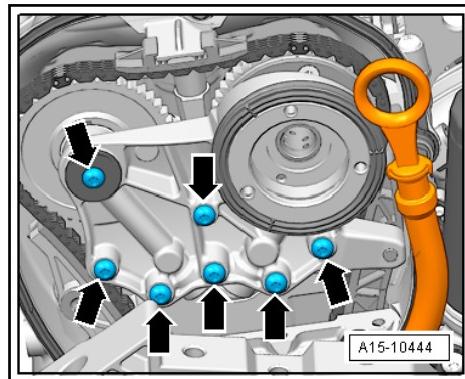
- If an adapter sleeve is installed, this will be moved with the bolt -1- in the cylinder head.

Continuation for All Vehicles

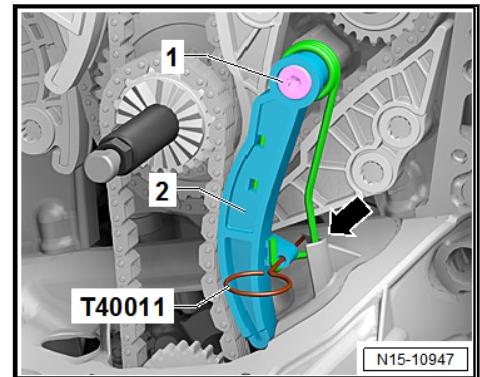
- Remove the -T40267-.



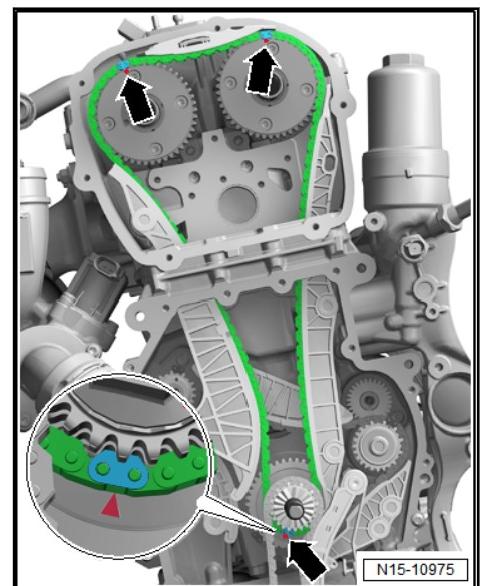
- Tighten the bearing bracket bolts -arrows-. Tightening specification. Refer to [⇒ 3.1 Camshaft Timing Chains](#), page [138](#).



- Install the chain tensioner -2-. The wire clip must come in to contact with the oil pan upper section opening -arrow-. Tighten the bolt -1- and remove the -T40011-.



- Check the adjustment. The painted chain links -arrows- must line up with the markings on the chain sprockets.



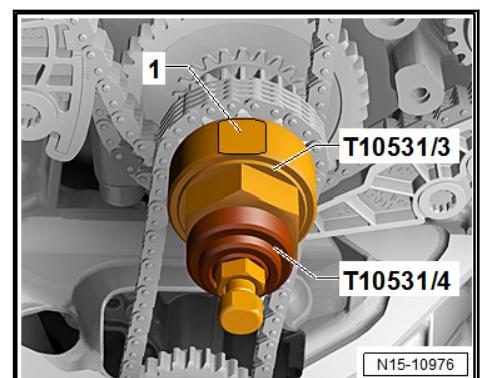
- Install the control valve. Refer to [C4.3 amshaft Adjustment Valve 1N205, Removing and Installing](#), page 185 .
- Let the engine turn a second time in the direction of engine rotation.



Note

Due to the ratio, the painted chain links no longer match up after the engine has been turned.

- Remove the -T10531/4- and remove the -T10531/3-.

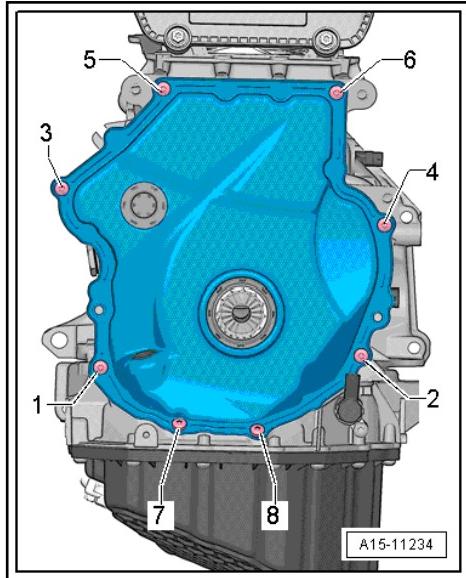




- Install the lower timing chain cover. Refer to [⇒ T2.2.2 iming Chain Cover, Removing and Installing](#), page 129 .

 Note

Tighten the bolts -1 and 4- with an additional turn after installing the vibration damper. The bolts must be removed again to install the vibration damper.



- Install the vibration damper. Refer to [⇒ D1.4 amper, Removing and Installing](#), page 51 .
- Install the upper timing chain cover. Refer to [⇒ T2.2.1 iming Chain Cover, Removing and Installing](#), page 127 .
- Install the ribbed belt tensioning damper. Refer to [⇒ B1.3 elt Tensioner, Removing and Installing](#), page 51 .
- Install the ribbed belt. Refer to [⇒ B1.2 elt, Removing and Installing](#), page 49 .
- Install the vacuum pump. Refer to [⇒ P1.4 ump, Removing and Installing](#), page 120 .
- Install the high pressure pump. Refer to [⇒ P7.2 ressure Pump, Removing and Installing](#), page 357 .

Installation is performed in reverse order of removal, while noting the following:

- After performing work on the chain drive the adaptation value in the engine control module must be adapted. To do so, turn on the ignition and select the following menu items on the Vehicle Diagnostic Tester:

- ◆ [01 – Engine electronics](#)
- ◆ [Guided Functions](#)
- ◆ [01 – Adaptation after repair work on the chain drive](#)

Tightening Specifications

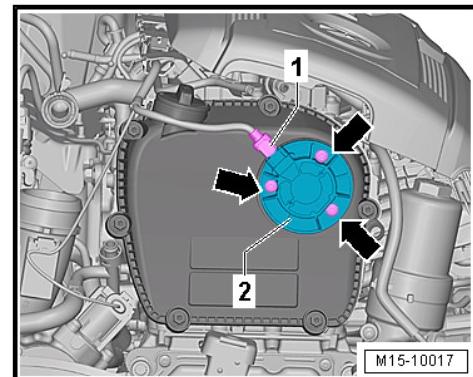
- ◆ Refer to [⇒ -4.1 Valvetrain](#), page 165
- ◆ Refer to [⇒ -7.1 High Pressure Pump](#), page 355 .
- ◆ Refer to [⇒ -3.1 Air Filter Housing](#), page 327 .



4.3 Camshaft Adjustment Valve 1 -N205-, Removing and Installing

Removing

- Remove the engine cover. Refer to [⇒ C3.1 over, Removing and Installing", page 40](#).
- Unclip the coolant and fuel lines and set them aside.
- Disconnect the connector -1- from the Camshaft Adjustment Valve 1 -N205-.



- Place a clean cloth under the camshaft adjustment valves.
- Remove the bolts -arrows- and then the Camshaft Adjustment Valve 1 -N205- -2-.

Installing

Install in reverse order of removal and note the following:



Note

Replace seals and O-rings.

- Lubricate seals on the Camshaft Adjustment Valve 1 -N205-/ Exhaust Camshaft Adjustment Valve 1 -N318- sealing surfaces with engine oil.

Tightening Specifications

- ◆ Refer to [⇒ -2.1 Timing Chain Cover", page 124](#)

4.4 Valve Stem Seals, Removing and Installing

[⇒ S4.4.1 tem Seals, Removing and Installing, Cylinder Head Installed", page 185](#)

[⇒ S4.4.2 tem Seals, Removing and Installing, Cylinder Head Removed", page 190](#)

4.4.1 Valve Stem Seals, Removing and Installing, Cylinder Head Installed

Special tools and workshop equipment required

- ◆ Spark Plug Removal Tool -3122B-
- ◆ Puller - Valve Seal -3364-
- ◆ Seal Installer - Valve Stem -3365-
- ◆ Valve Cotter Tool Kit - Adapter -T40012-

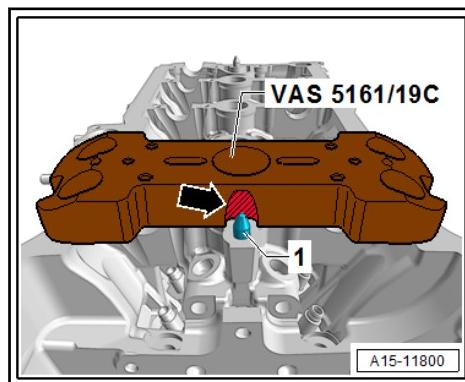


- ◆ Torque Wrench 1331 5-50Nm -VAG1331-
- ◆ Valve Keeper Tool Kit -VAS5161A-
- ◆ Valve Cotter Tool Kit - Guide Plate 19B -VAS5161/19B-

Remove Valve Stem Seals

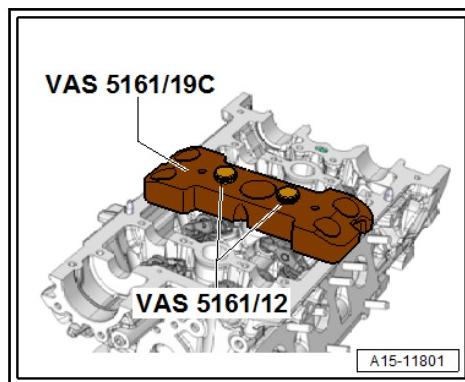
- Remove the camshafts. Refer to [R4.2 removing and Installing](#), page 167.
- Mark the allocation of the roller rocker lever and the hydraulic adjuster so they can be installed again.
- Remove the roller rocker levers with the hydraulic adjuster and place them on a clean surface.
- Remove the spark plugs using a -3122B-.

Guide Plate, Reworking

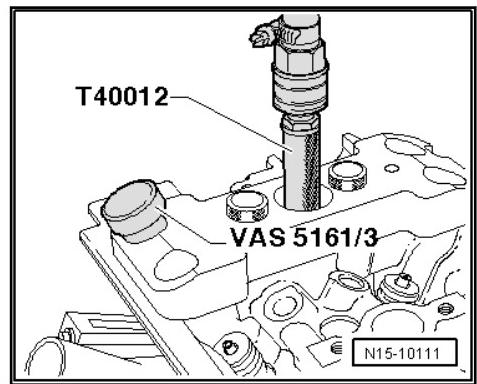


Check if the opening -arrow- is present.

- If necessary, rework the -VAS5161/19C- -arrow- until the guide plate touches the cylinder head and the guide pin -1- is free.
- Tighten the -VAS5161/19C- on the cylinder head as shown using the -VAS5161A/12-.

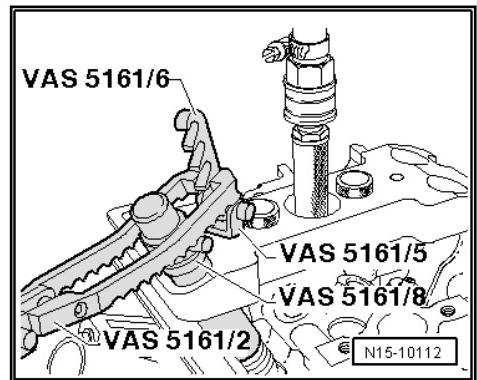


- Set the piston for the respective cylinder to "bottom dead center (BDC)".
- Install the -T40012- in the spark plug threads.



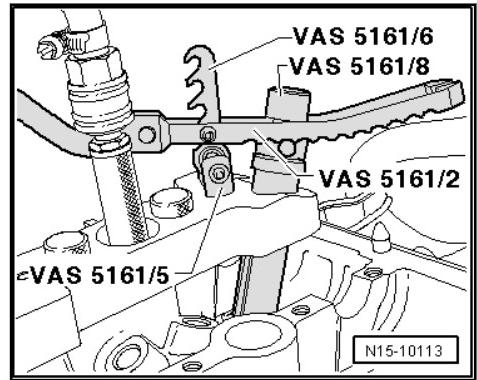
- Connect compressed air with at least 6 bar (87 psi) pressure.
- Loosen stuck valve retainers using a -VAS5161/3A- and a plastic hammer.

For the Intake Side



- Install the -VAS5161/6- with -VAS5161/5- in the center thread of the - VAS5161/19B-.
- Place the -VAS5161/8- in the -VAS5161/19B-.
- Engage the -VAS5161/2- on the -VAS5161/6-.

For the Exhaust Side



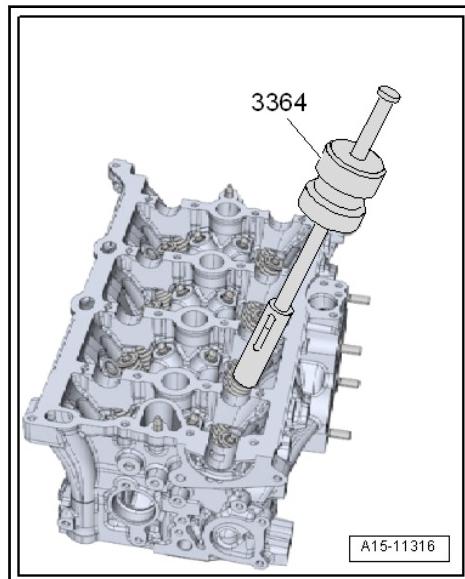
- Install the -VAS5161/6- with -VAS5161/5- in the outer thread of the - VAS5161/19B-.
- Press down the -VAS5161/8A- and at the same time turn the knurled thumb screw on the -VAS5161/8A- to the right until the points engage in the Valve retainers.
- Move the knurled thumb screw back and forth slightly. This presses the valve retainers apart and captures them in the installation cartridge.



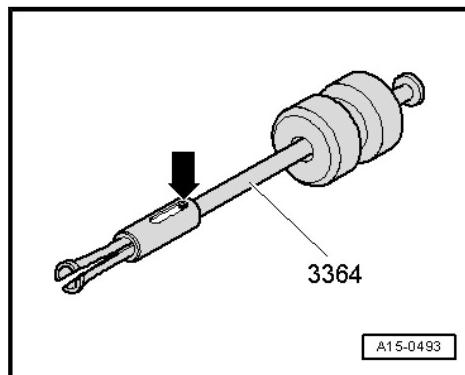
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4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

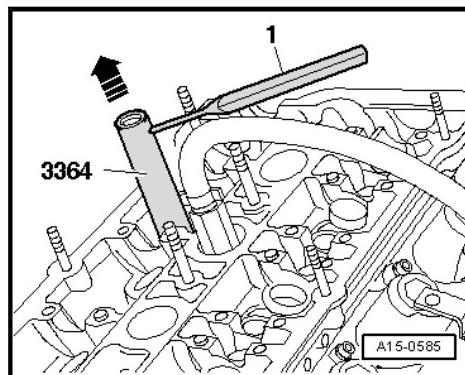
- Release the -VAS5161/2-.
- Remove the -VAS5161/8A-.
- Remove the valve stem seals using -3364-.



- If the -3364- cannot be used because there is not enough space, drive the spring pin -arrow- out using a drift and remove the impact attachment.



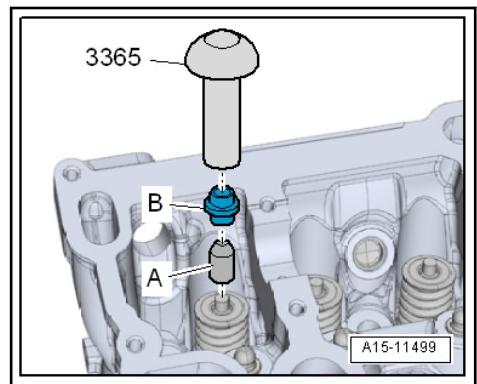
- Position the lower section of the -3364- on the valve stem seal.



- Place the drift -1- in the hole in the lower section of the removal tool.
- Position the lever on the removal tool and remove the valve stem seal in direction of -arrow-.

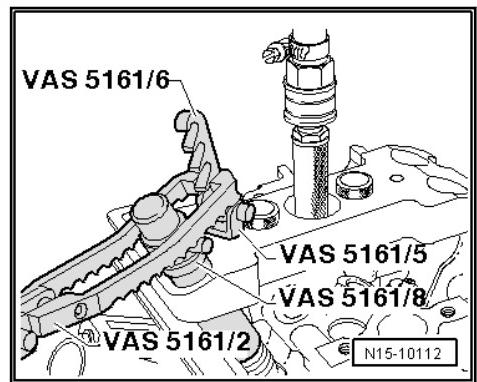


Install Valve Stem Seals

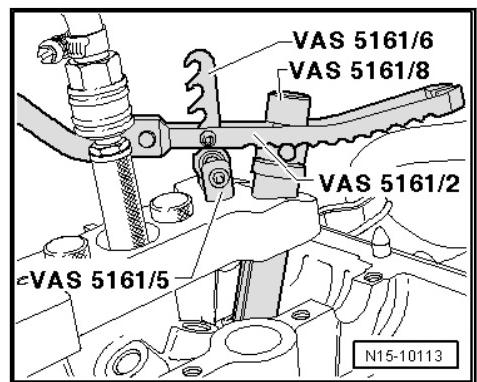


- Place the plastic sleeve -A- that is attached to the new valve stem seals -B- on the valve stem.
- Lightly oil the valve stem seal sealing lip.
- Slide the valve stem seal onto the plastic sleeve.
- Carefully press the valve stem seal onto the valve guide with the -3365-.
- Remove plastic sleeve.
- Insert the valve spring and valve spring retainer.
- Connect the -VAS5161A- as illustrated.

Intake Side



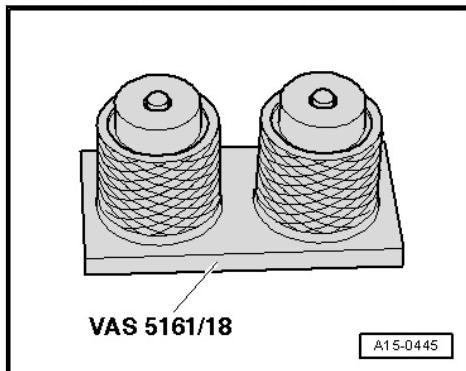
Exhaust Side





Note

If the Valve retainers were removed from the installation cartridge, they must then be inserted into the -VAS5161/18-.



Press the -VAS5161/8A- onto the insertion device from above and capture the valve retainers.

- Press the -VAS5161/8A- down with the -VAS5161/2- and rotate the cartridge knurled thumb screw back and forth while pulling up.
- Release the -VAS5161/2- with the knurled thumb screw pulled.
- Remove the -VAS5161A-.

Further assembly is performed in the reverse order of removal, but observe the following:

- Install the camshafts. Refer to [R4.2 emoving and Instal-
ling", page 167](#).

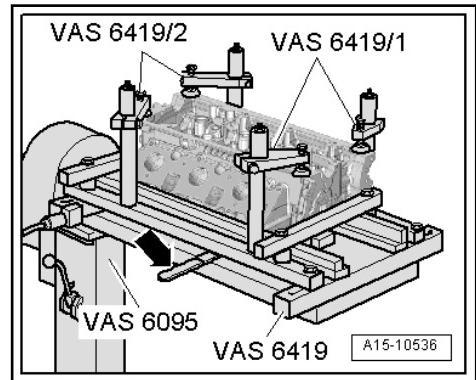
4.4.2 Valve Stem Seals, Removing and In- stalling, Cylinder Head Removed

Special tools and workshop equipment required

- ◆ Puller - Valve Seal -3364-
- ◆ Seal Installer - Valve Stem -3365-
- ◆ Valve Cotter Tool Kit -VAS5161A-
- ◆ Valve Cotter Tool Kit - Guide Plate 19B -VAS5161/19B-
- ◆ Engine and Gearbox Bracket VAS6095A -VAS6095A-
- ◆ Cylinder Head Tensioning Device -VAS6419-

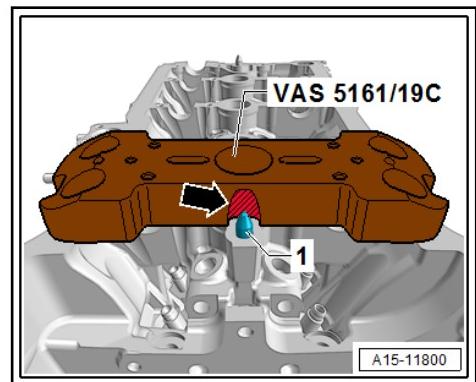
Procedure

- Remove the camshafts. Refer to [R4.2 emoving and Instal-
ling", page 167](#).
- Mark the allocation of the roller rocker lever and the hydraulic adjuster so they can be installed again.
- Remove the roller rocker levers with the hydraulic adjuster and place them on a clean surface.
- Insert the -VAS6419- in the -VAS6095A-.



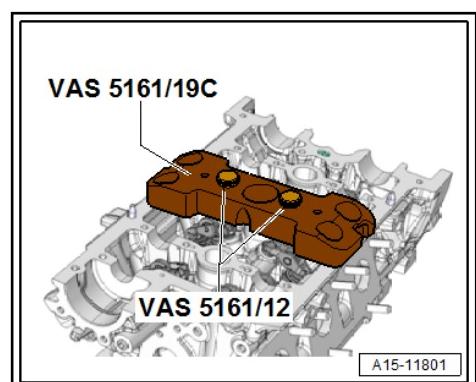
- Tension the cylinder head on the cylinder head tensioning device, as shown.
- Connect the cylinder head tensioning device to the compressed air.
- Slide the air cushion with the lever -arrow- under the combustion chambers onto the valve stem seal that will be removed.
- Let enough compressed air flow into the air cushion until it contacts the valve plate.

Guide Plate, Reworking



Check if the opening -arrow- is present.

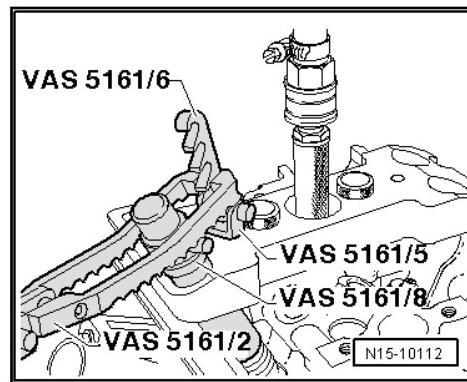
- If necessary, rework the -VAS5161/19C- -arrow- until the guide plate touches the cylinder head and the guide pin -1- is free.
- Fasten the -VAS5161/19C- on the cylinder head as shown using the -VAS5161/12-.



- Insert the -VAS5161/3- in the guide plate and loosen the stuck valve retainers with a plastic mallet.

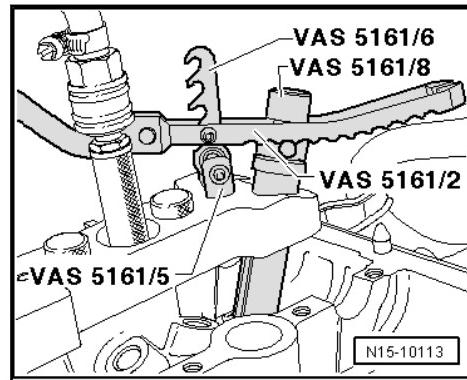


For the Intake Side

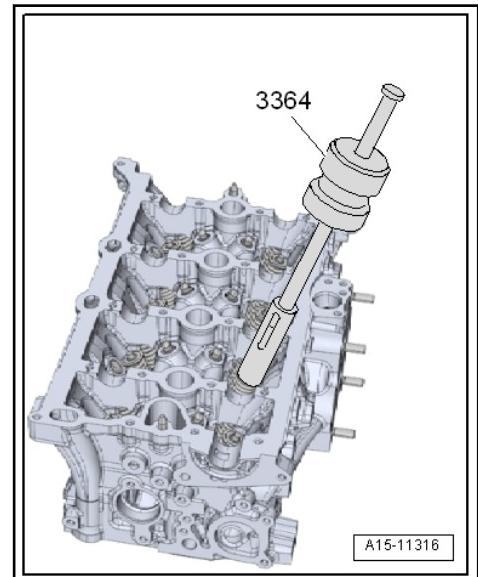


- Install the -VAS5161/6- with -VAS5161/5- in the center thread of the - VAS5161/19B-.
- Place the -VAS5161/8- in the -VAS5161/19B-.
- Engage the -VAS5161/2- on the -VAS5161/6-.

For the Exhaust Side

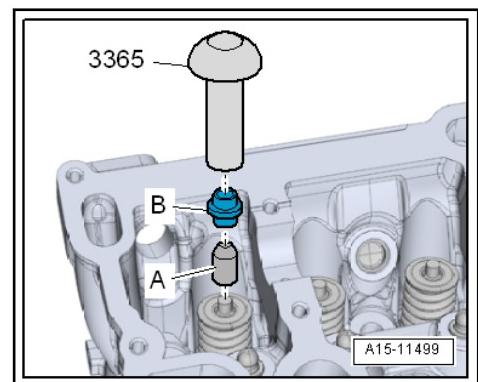


- Install the -VAS5161/6- with -VAS5161/5- in the outer thread of the -VAS5161/19B-.
- Press down the -VAS5161/8A- and at the same time turn the knurled thumb screw on the -VAS5161/8A- to the right until the points engage in the Valve retainers.
- Move the knurled thumb screw back and forth slightly. This presses the valve retainers apart and captures them in the installation cartridge.
- Release the -VAS5161/2-.
- Remove the -VAS5161/8A-.
- Remove the valve stem seals using -3364-.



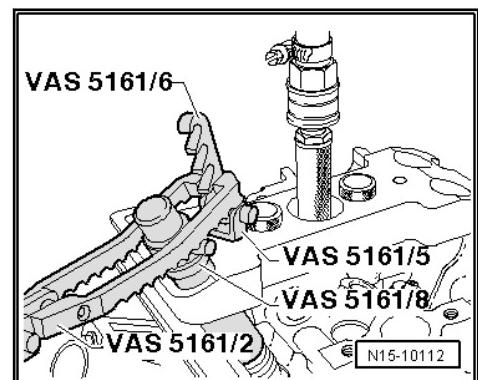
Install Valve Stem Seals

- Place the plastic sleeve -A- that is attached to the new valve stem seals -B- on the valve stem.



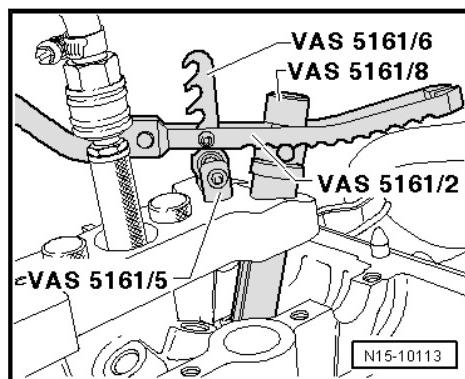
- Lightly oil the valve stem seal sealing lip.
- Slide the valve stem seal onto the plastic sleeve.
- Carefully press the valve stem seal onto the valve guide with the -3365-.
- Remove the plastic sleeve.
- Insert the valve spring and valve spring retainer.
- Install the -VAS5161A- as illustrated.

Intake Side



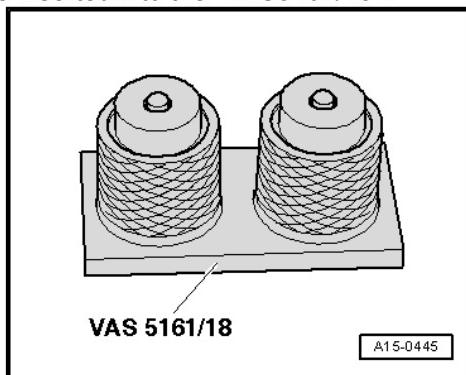


Exhaust Side



Note

If the Valve retainers were removed from the installation cartridge, they must then be inserted into the -VAS5161/18-.



Press the -VAS5161/8A- onto the insertion device from above and capture the valve retainers.

- Press the -VAS5161/8- down with the -VAS5161/2- and rotate the cartridge knurled thumb screw back and forth while pulling up.
- Release the -VAS5161/2- with the knurled thumb screw pulled.
- Remove the -VAS5161A-.

Further assembly is performed in the reverse order of the removal. Note the following:

- Install the camshafts. Refer to [R4.2 removing and Installing](#), page 167 .



5 Intake and Exhaust Valves

[⇒ G5.1 uides, Checking", page 195](#)

[⇒ C5.2 hecking", page 195](#)

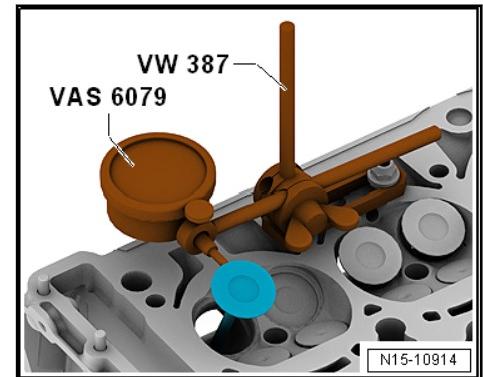
[⇒ D5.3 imensions", page 196](#)

5.1 Valve Guides, Checking

Special tools and workshop equipment required

- ◆ Dial Gauge Holder -VW387-
- ◆ Dial Gauge - 0-10mm -VAS6079-

Test Sequence



- Insert the valve into guide. The valve stem end must be flush with the guide. Due to differences in valve stem diameter, make sure that only intake valves are used to check intake valve guides, and only exhaust valves are used to check exhaust valve guides.
- Determine the tilting clearance.

Wear Limit

Intake Valve Guide	Exhaust Valve Guide
0.80 mm	0.80 mm



Note

- ◆ If the wear limit is exceeded, measure using new valves. Replace the cylinder head if the wear limit is still exceeded.
- ◆ If the valve was replaced during a repair, a new valve must be used to measure.

5.2 Valves, Checking

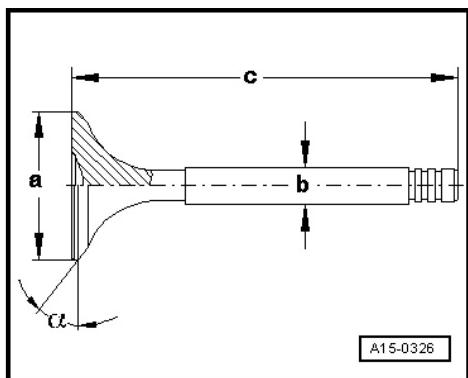
- Check the valves at stem and seating surface for wear grooves.
- If there are clear wear grooves, replace the valve.



5.3 Valve Dimensions



Intake and exhaust valves must not be reworked. Only lapping is permitted.

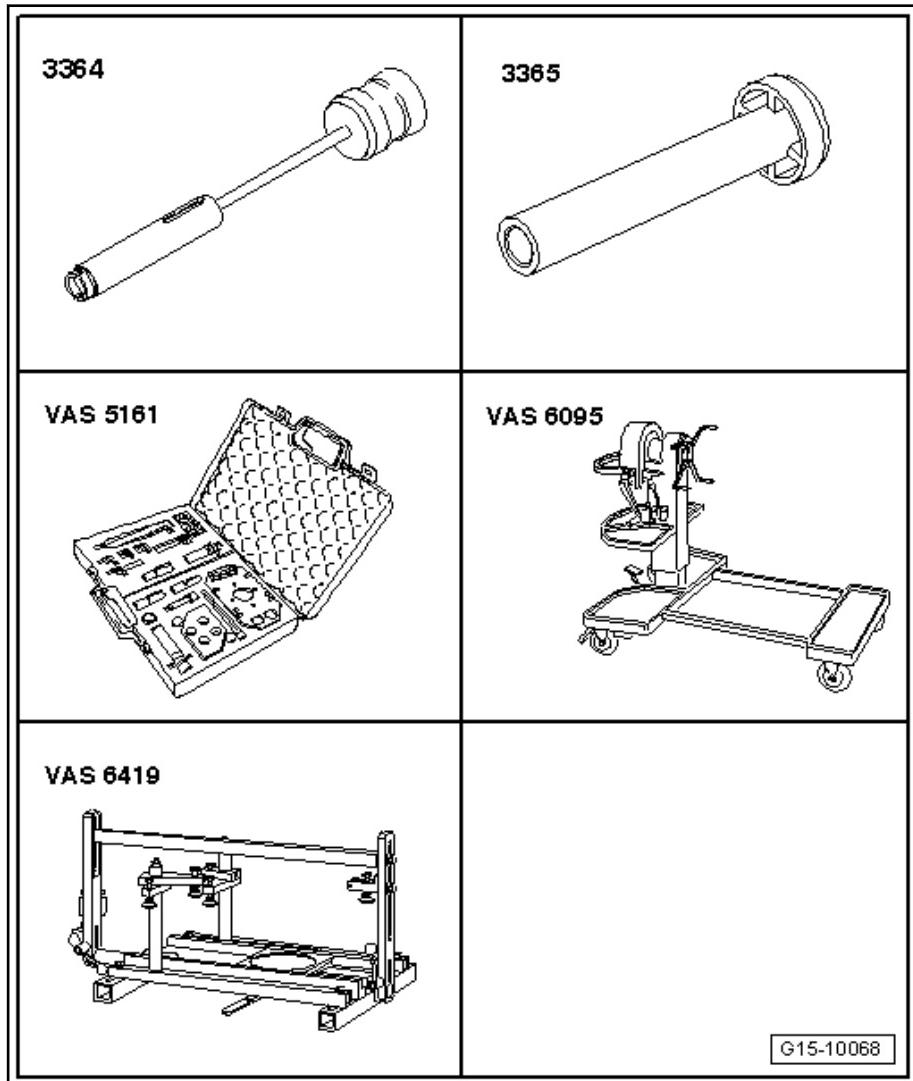


Dimension	Intake Valve	Exhaust Valve
Diameter a mm	33.85 ± 0.10	28.0 ± 0.1
Diameter b mm	5.98 ± 0.01	5.96 ± 0.01
c mm	104.0 ± 0.2	101.9 ± 0.2
α °	45	45

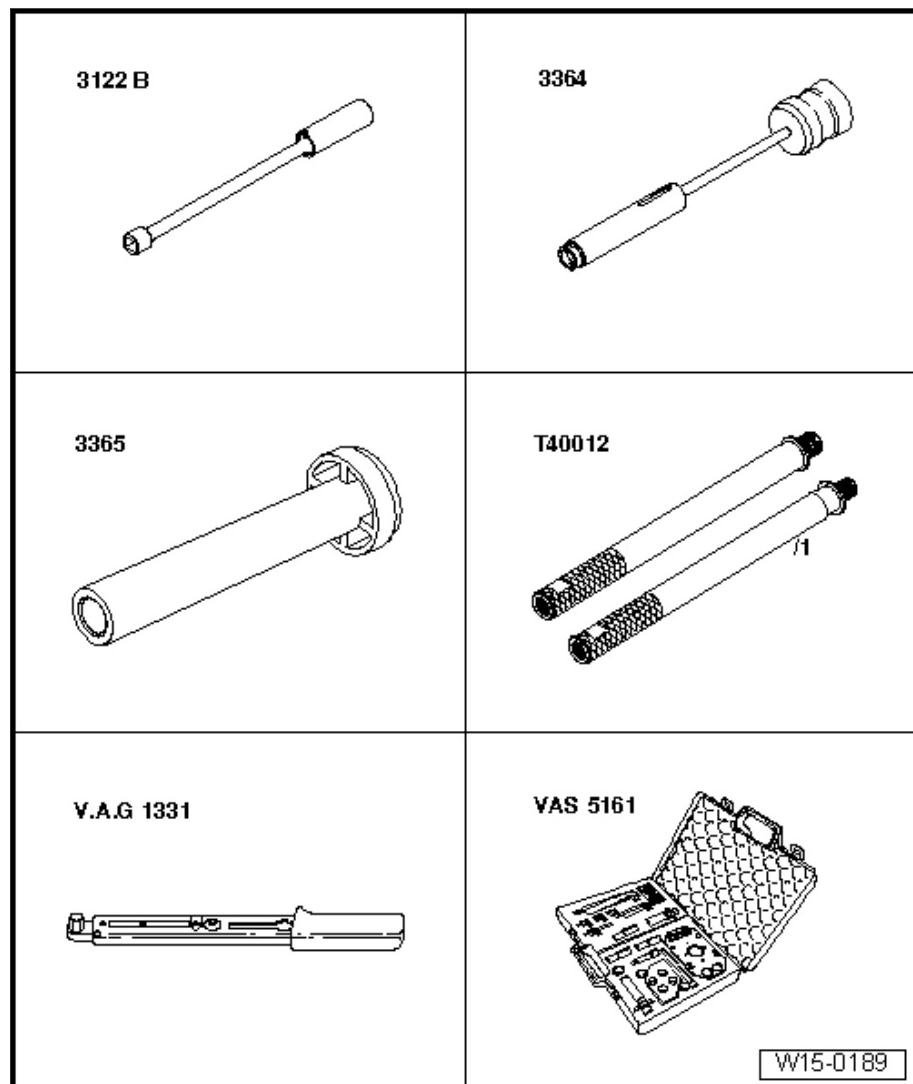


6 Special Tools

Special tools and workshop equipment required

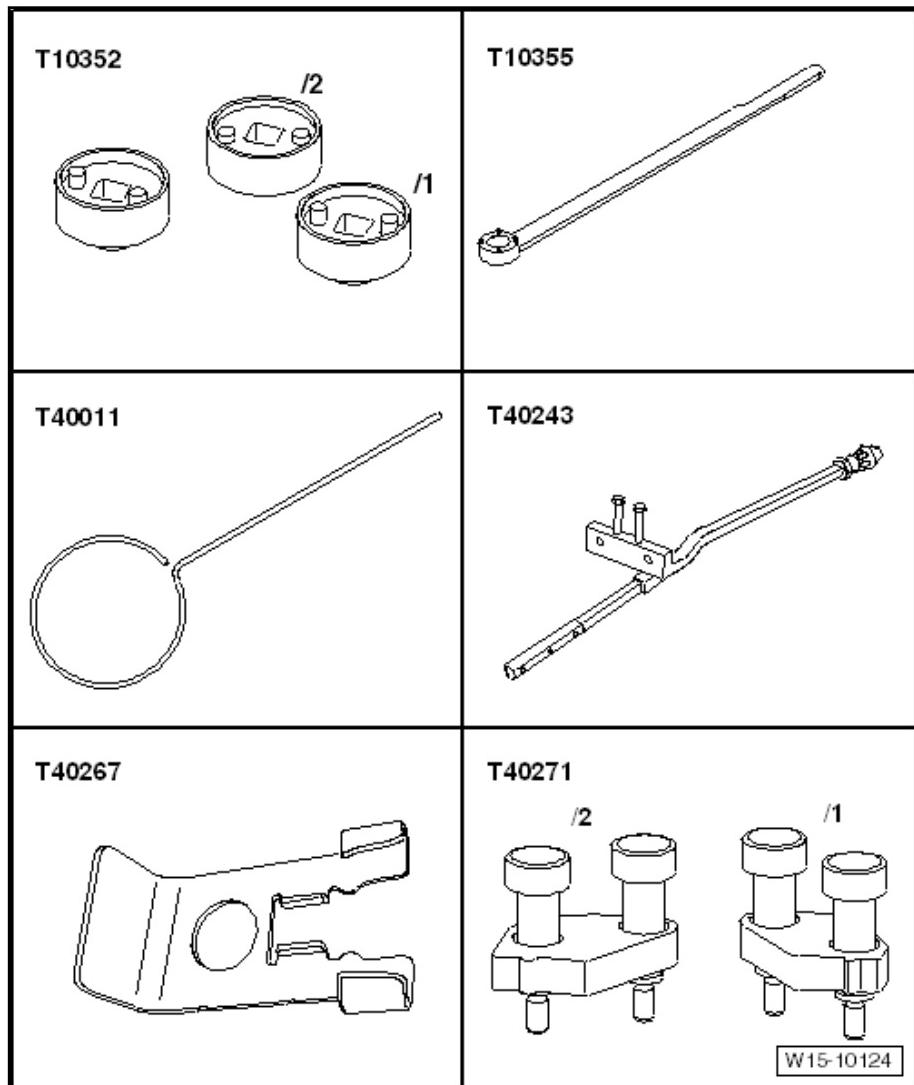


- ◆ Puller - Valve Seal -3364-
- ◆ Seal Installer - Valve Stem -3365-
- ◆ Valve Cotter Tool Kit -VAS5161A-
- ◆ Valve Cotter Tool Kit - Guide Plate 19B -VAS5161/19B-
- ◆ Engine and Gearbox Bracket VAS6095A -VAS6095A-
- ◆ Cylinder Head Tensioning Device -VAS6419-

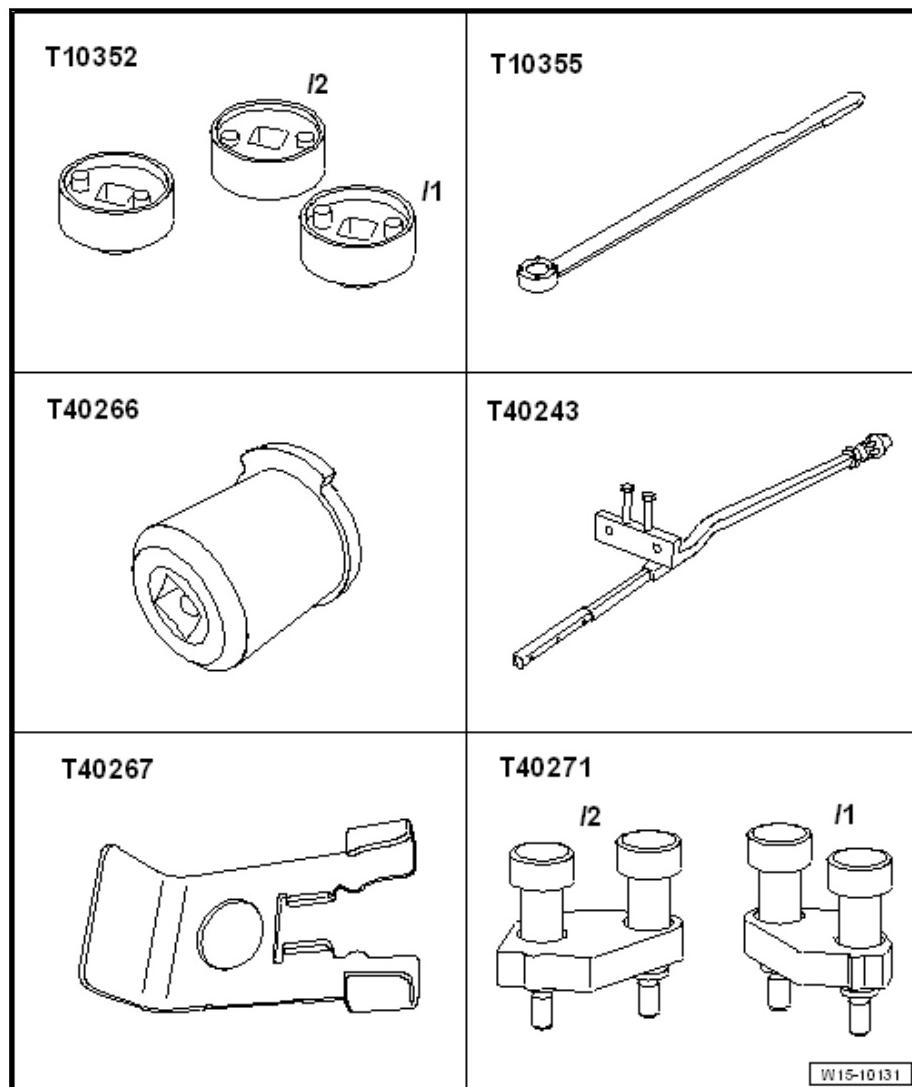


W15-0189

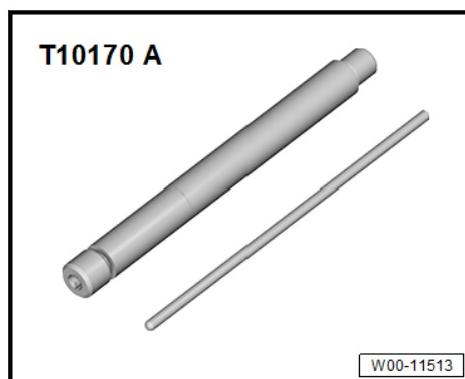
- ◆ Spark Plug Removal Tool -3122B-
- ◆ Puller - Valve Seal -3364-
- ◆ Seal Installer - Valve Stem -3365-
- ◆ Valve Cotter Tool Kit - Adapter -T40012-
- ◆ Torque Wrench 1331 5-50Nm -VAG1331-
- ◆ Valve Keeper Tool Kit -VAS5161A-
- ◆ Valve Cotter Tool Kit - Guide Plate 19B -VAS5161/19B-



- ◆ Assembly Tool -T10352/2-
- ◆ Counterhold - Vibration Damper -T10355-
- ◆ Locking Pin (3 pc.) -T40011-
- ◆ Chain Tensioner Lever -T40243-
- ◆ Tensioner Locking Tool -T40267-
- ◆ Camshaft Locks -T40271-

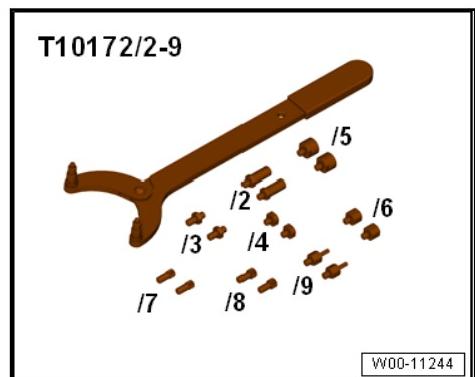


- ◆ Central Valve Assembly Tool -T10352-
- ◆ Counterhold - Vibration Damper -T10355-
- ◆ Chain Tensioner Lever -T40243-
- ◆ Tensioner Locking Tool -T40267-
- ◆ Camshaft Locks -T40271-
- ◆ Adapter -T40266-
- ◆ Dial Gauge Adapter -T10170A-

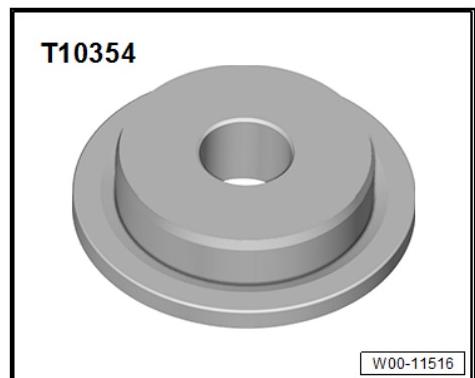




- ◆ Counterhold - Multiple Use -T10172A- with Counterhold - Kit
- Adapter 2 -T10172/9-



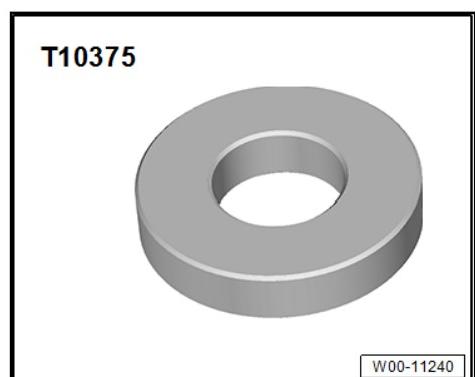
- ◆ Seal Installer - Crankshaft -T10354-



- ◆ Press Piece - Timing Chain Cover -T10368-

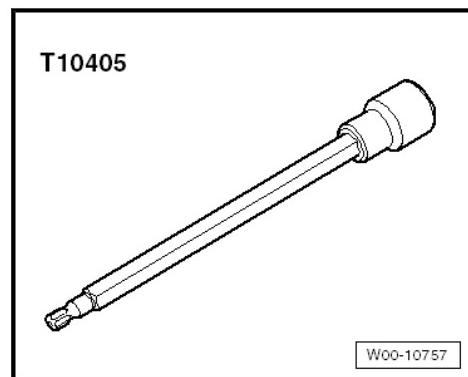


- ◆ Press Piece - Gearbox -T10375-

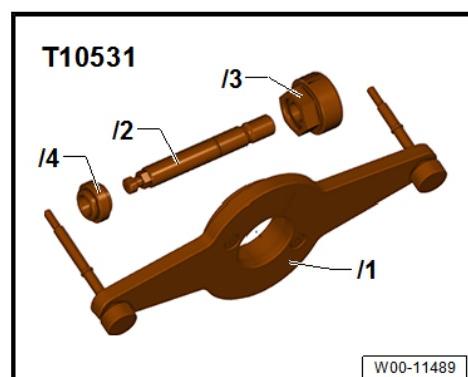




- ◆ Socket T30 -T10405-



- ◆ Vibration Damper Assembly Tool -T10531-



- ◆ Adapter -T40266-



- ◆ Seal Installer - Crankshaft -T40274-





- ◆ Compression Tester Kit - Adapter 5A -VAG1381/5A-

VAG 1381/ 5A

W00-11565

- ◆ Compression Tester Kit -VAG1763-

V.A.G 1763

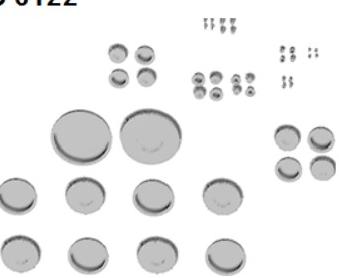
W00-11177

- ◆ Dial Gauge - 0-10mm -VAS6079-

VAS 6079

W00-11309

- ◆ Engine Bung Set -VAS6122-

VAS 6122

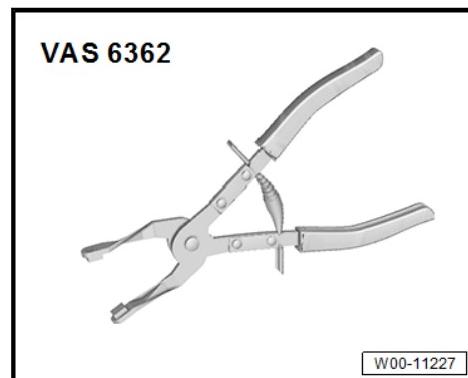
W00-11228



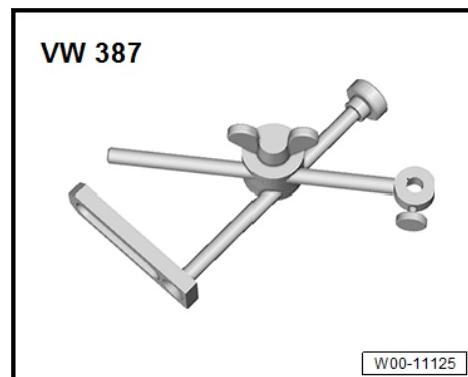
- ◆ Dial Gauge Set -VAS6341-



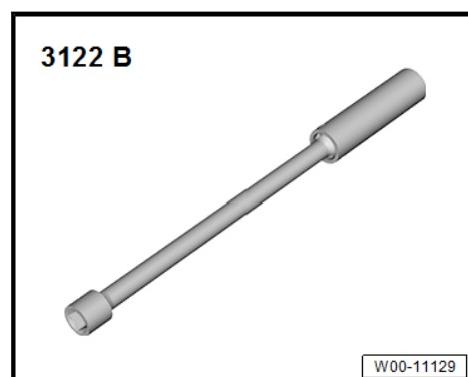
- ◆ Hose Clip Pliers -VAS6362-



- ◆ Dial Gauge Holder -VW387-



- ◆ Spark Plug Removal Tool -3122B-





17 – Lubrication

1 Oil Pan/Oil Pump

[⇒ -1.1 Oil Pan/Oil Pump", page 205](#)

[⇒ O1.2 ii", page 208](#)

[⇒ P1.3 an Lower Section, Removing and Installing", page 209](#)

[⇒ P1.4 an Upper Section, Removing and Installing", page 211](#)

[⇒ P1.5 pump, Removing and Installing", page 215](#)

[⇒ O1.6 oil Level Thermal Sensor G266, Removing and Instal-
ling", page 217](#)

1.1 Overview - Oil Pan/Oil Pump



Note

If large quantities of metal shavings or other deposits such as those caused by partial seizure of the crankshaft or connecting rod damage are found in the engine oil, clean the oil channels thoroughly and replace the engine oil cooler to prevent further damage.



Jetta 2011 >, Jetta 2015 >

4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

1 - Nut

- 9 Nm

2 - Oil Level Thermal Sensor -G266-

- Removing and installing. Refer to [⇒ O1.6 ii Level Thermal Sensor G266, Removing and Installing](#), page 217 .

3 - O-ring

- Coat with engine oil
- Not available separately, part of Oil Level Thermal Sensor -G266-
- Replace Oil Level Thermal Sensor -G266- if O-ring is damaged.

4 - Oil Drain Plug/Plug

- Sheet metal oil pan: 30 Nm
- Plastic oil pan: turn all the way using a flat-head screwdriver or a coin

5 - Seal/O-ring

- Replace after removing

6 - Oil Pan Lower Section

- Removing and installing. Refer to [⇒ P1.3 an Lower Section, Removing and Installing](#), page 209 .

7 - Seal

- Not installed

8 - Bolt

- 4 Nm +45°
- Replace after removing
- For the oil baffle and oil intake pipe

9 - Oil Baffle

- Replace after removing

10 - O-ring

- Coat with engine oil
- Replace after removing

11 - Oil Intake Pipe

- Clean the strainer if it is dirty.

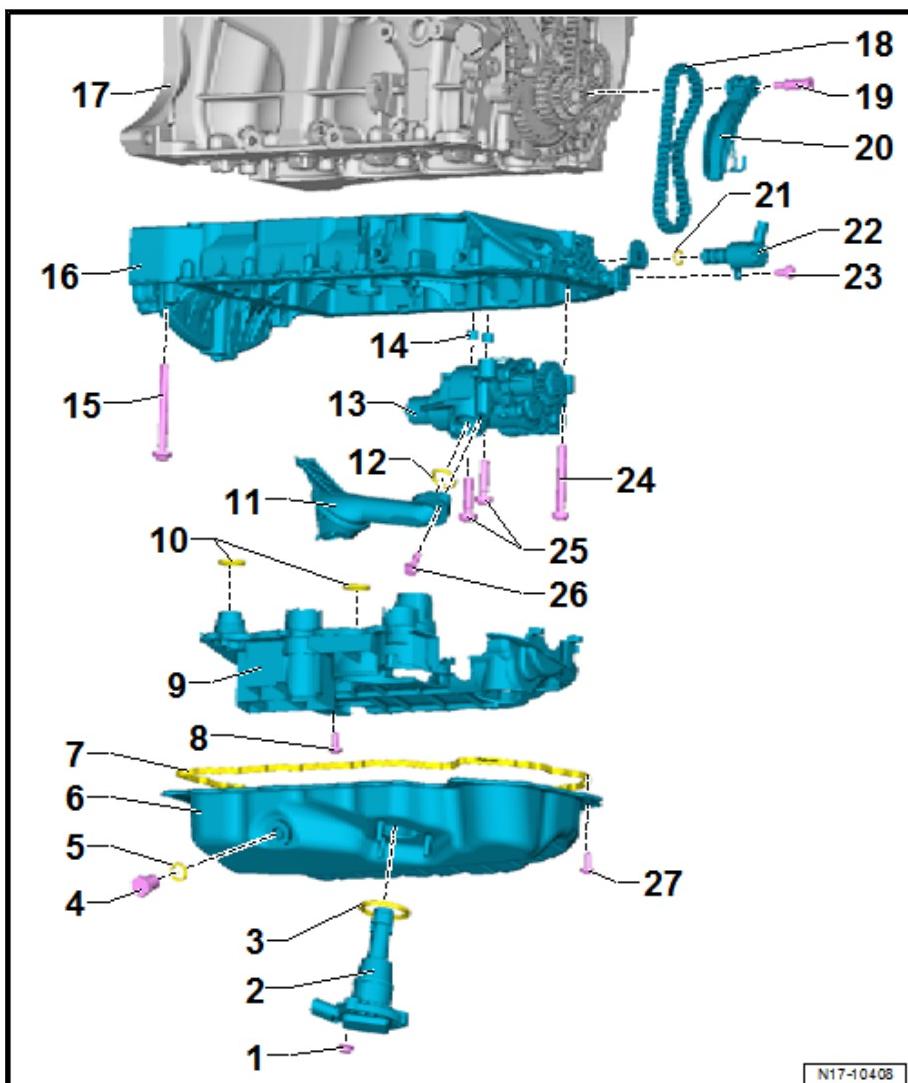
12 - O-ring

- Coat with engine oil
- Replace after removing

13 - Oil Pump

- Removing and installing. Refer to [⇒ P1.5 ump, Removing and Installing](#), page 215 .

14 - Centering Bracket



**15 - Bolt**

- Tightening sequence. Refer to [Fig. “Sheet Metal Oil Pan Lower Section - Tightening Sequence”
page 207](#)
- Replace after removing

16 - Oil Pan Upper Section

- Tightening sequence. Refer to [Fig. “Oil Pan Upper Section - Tightening Sequence”
page 208](#)
- Removing and installing. Refer to [P1.4 an Upper Section, Removing and Installing](#), page 211.

17 - Cylinder Block**18 - Oil Pump Drive Chain**

- Mark direction of rotation before removing

19 - Bolt

- 9 Nm

20 - Chain Tensioner**21 - O-ring**

- Replace after removing
- Coat with engine oil

22 - Oil Pressure Regulation Valve -N428-

- Removing and installing. Refer to [O4.6 Oil Pressure Regulation Valve N428, Removing and Instal-
ling](#), page 232.

23 - Bolt

- Tightening specification -item 1- [Item 1 \(page 226\)](#).

24 - Oil Pump Bolt

- 8 Nm +90°
- Replace after removing

25 - Oil Pump Bolt

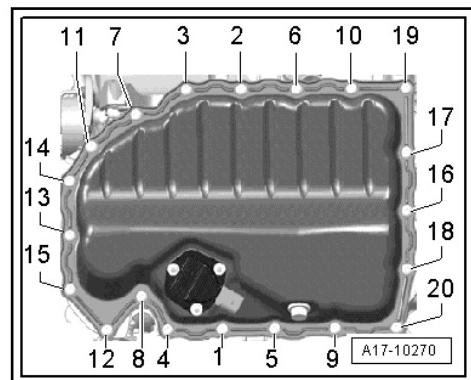
- 8 Nm +90°
- Replace after removing

26 - Oil Intake Pipe Bolt

- 4 Nm +45°
- Replace after removing

27 - Oil Pan Bolt

- Replace after removing
- Tightening sequence. Refer to [Fig. “Sheet Metal Oil Pan Lower Section - Tightening Sequence”
page 207](#)

Sheet Metal Oil Pan Lower Section - Tightening Sequence



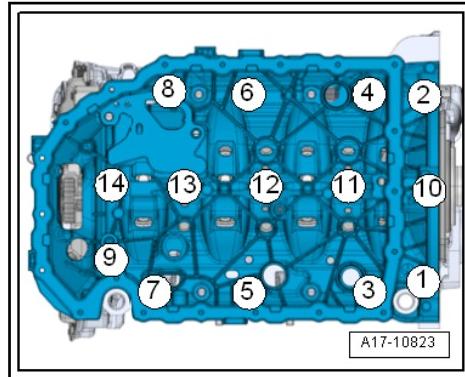
Note

Replace the bolts that were tightened with an additional turn.

- Tighten the bolts -1 through 20- in two stages in the sequence shown:

Step	Tightening Sequence and Tightening Specification
1. Bolts -1 through 20-	8 Nm
2. Bolts -1 through 20-	45° additional turn

Oil Pan Upper Section - Tightening Sequence



Note

Replace the bolts that were tightened with an additional turn.

- Tighten the bolts -1 through 14- in the sequence shown:

Step	Bolts	Tightening Sequence and Tightening Specification
1.	-1 to 14-	8 Nm
2.	-1 and 2-	180° additional turn
3.	-3 to 9-	45° additional turn
4.	-10-	180° additional turn
5.	-11 to 14-	Turn an additional 90°.

1.2 Engine Oil

Oil Capacity:

Refer to ⇒ Fluid Capacity Tables; Rep. Gr. 03

Engine oil specification. Refer to the ⇒ Maintenance Intervals; Rep. Gr. 03.

Replacing the engine oil. Refer to ⇒ Maintenance; Booklet 20.2; Procedure Descriptions; Engine Oil, Draining or Extracting, Changing Oil Filter and Filling Oil.

Checking the engine oil level. Refer to ⇒ Maintenance; Booklet 20.2.



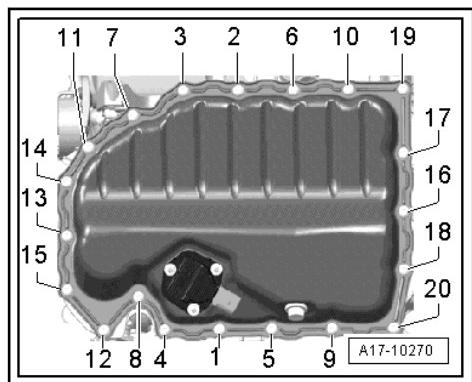
1.3 Oil Pan Lower Section, Removing and Installing

Special tools and workshop equipment required

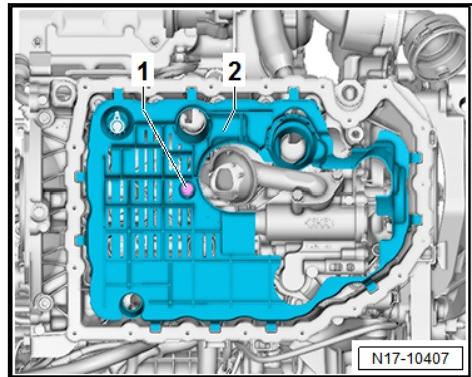
- ◆ Used Oil Collection and Extraction Unit -SMN372500-
- ◆ Hand Drill with Plastic Brush Attachment
- ◆ Protective Eyewear
- ◆ Silicone sealant. Refer to Parts Catalog.

Removing

- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Engine oil drained. Refer to ⇒ Maintenance; Booklet 20.2.
- Oil Level Thermal Sensor -G266-, Removing. Refer to ⇒ [O1.6 Oil Level Thermal Sensor G266, Removing and Installation](#), page 217 .
- Remove the bolts -1 through 20-.



- Carefully loosen the oil pan lower section from the bond.
- Remove the bolt -1- and remove the oil baffle -2-.





Installing



Note

- ◆ Be sure to check the expiration date of the silicone sealant.
- ◆ The oil pan must be installed within five minutes after application of silicone sealant.
- ◆ Replace the bolts that were tightened with an additional turn.
- ◆ Replace the gaskets, seals and self-locking nuts.

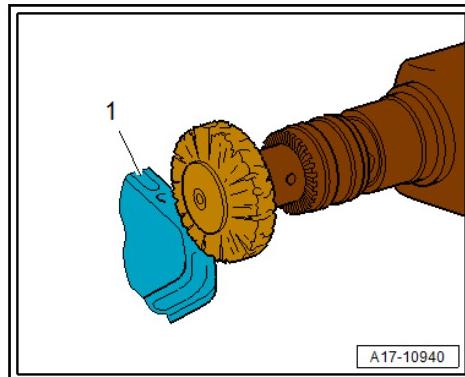


Caution

Risk of injuring the eyes from sealant residue.

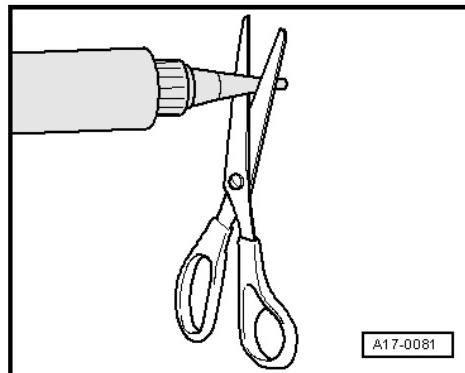
- Wear protective eyewear.

- Install a new oil baffle. Tightening specification: -item 8- [Item 8 \(page 206\)](#)
- Spray the sealing surface with sealant remover and allow it to work.
- Remove any sealant residue on the upper section of the oil pan using a flat blade scraper.
- Remove any remaining sealant from the oil pan lower section using, for example, a rotating plastic brush.



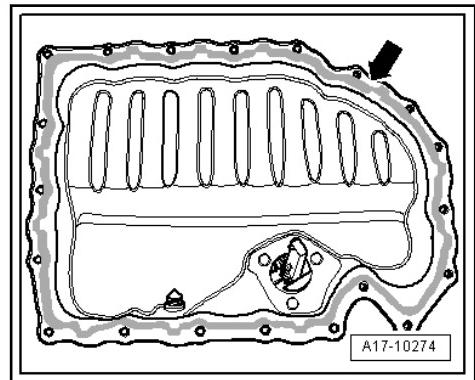
A17-10940

- Sealing surfaces must be free of oil and grease.
- Cut the tube nozzle at the front marking (nozzle diameter: approximately 3 mm).



A17-0081

- Apply silicone sealant on the clean sealing surface of the oil pan lower section as shown in illustration.



- ◆ Sealant bead thickness: 2 to 3 mm.

 **Note**

- ◆ *The oil pan must be installed within five minutes after application of silicone sealant.*
- ◆ *The sealant bead may not be thicker than specified, otherwise excess sealant could enter the oil pan and clog the oil intake pipe screen.*

 **Note**

After installing the oil pan, allow the sealant to dry for approximately 30 minutes. Only afterward may the engine oil be replenished.

- Position the lower section of the oil pan immediately and tighten the bolts, tightening sequence. Refer to ⇒ Fig. “[Sheet Metal Oil Pan Lower Section - Tightening Sequence](#)”, page 207 .
- Fill the engine oil and check the oil level. Refer to ⇒ Maintenance; Booklet 20.2.
- Install the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.

Tightening Specifications

- ◆ Refer to ⇒ [-1.1 Oil Pan/Oil Pump](#), page 205

1.4 Oil Pan Upper Section, Removing and Installing

Special tools and workshop equipment required

- ◆ Elbow Assembly Tool -T10118-
- ◆ Chain Tensioner Locking Tool -T40265-
- ◆ Hand Drill with Plastic Brush Attachment
- ◆ Protective Eyewear
- ◆ Silicone sealant. Refer to Parts Catalog.

Removing

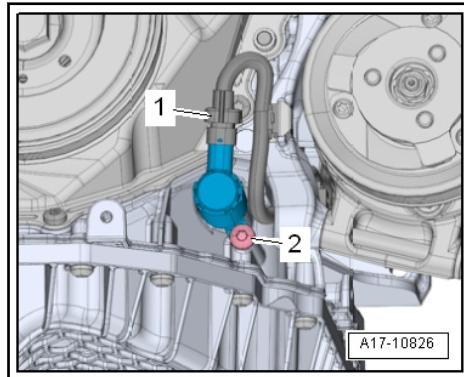
- The transmission is removed.
- Remove the oil pan lower section. Refer to ⇒ [P1.3 an Lower Section, Removing and Installing](#), page 209 .



Jetta 2011 >, Jetta 2015 >

4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

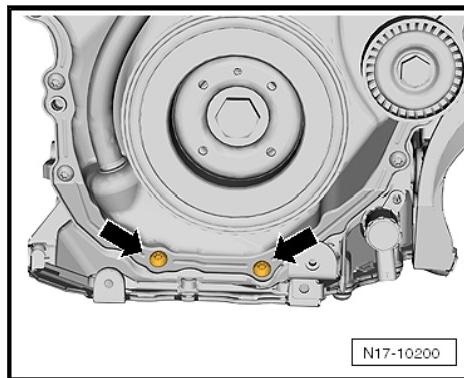
- Remove the transmission side sealing flange. Refer to [F2.5 lange, Removing and Installing, Transmission Side](#), page 71 .
- Remove the oil pump. Refer to [P1.5 ump, Removing and Installing](#), page 215 .
- Disconnect the connector -1-.



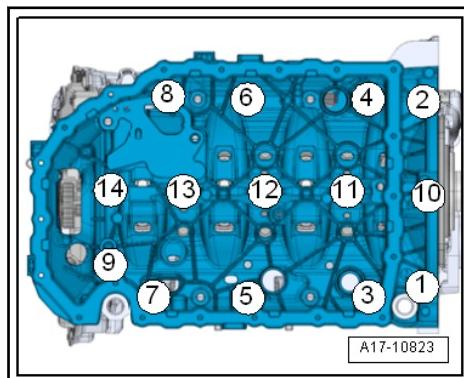
Note

Ignore -2-.

- Remove the bolts -arrows-.



- Remove the bolts -1 through 14- and the upper section of the oil pan.



- First pry the oil pan upper section out on the transmission side. When prying out, be careful not to bend the timing chain cover.



Installing



Note

- ◆ Be sure to check the expiration date of the silicone sealant.
- ◆ The oil pan upper section must be installed within five minutes of applying the silicone sealant.
- ◆ Replace the bolts that were tightened with an additional turn.
- ◆ Replace the gaskets, seals and self-locking nuts.
- Remove any sealant residue on the cylinder block using a flat blade scraper.

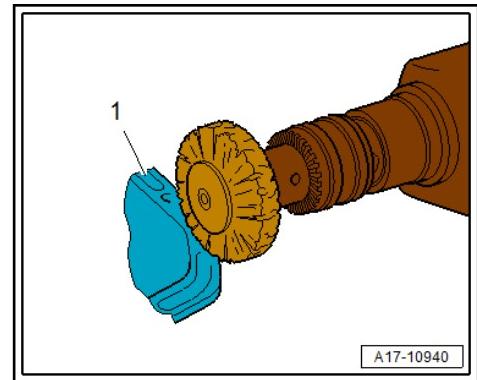


Caution

Risk of injuring the eyes from sealant residue.

- Wear protective eyewear.

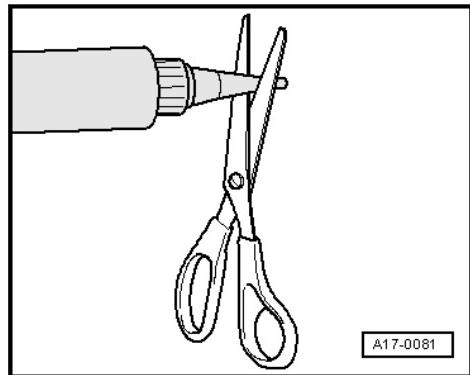
- Remove any remaining sealant on oil pan upper section using, for example, a rotating plastic brush.



Note

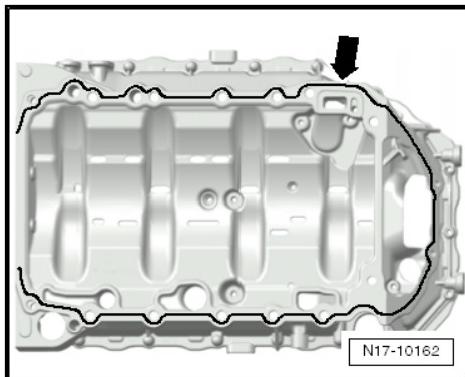
See if the timing chain cover is deformed. Then mount the oil pan upper section without any sealant and check the gap between the cover and the oil pan upper section. If deformation is found and the cover cannot be aligned, replace the cover after installing the oil pan upper section.

- Sealing surfaces must be free of oil and grease.
- Check for dirt in the oil passages in the oil pan upper section and in the crankshaft housing.
- Cut the tube nozzle at the front marking (nozzle diameter: approximately 2 mm).

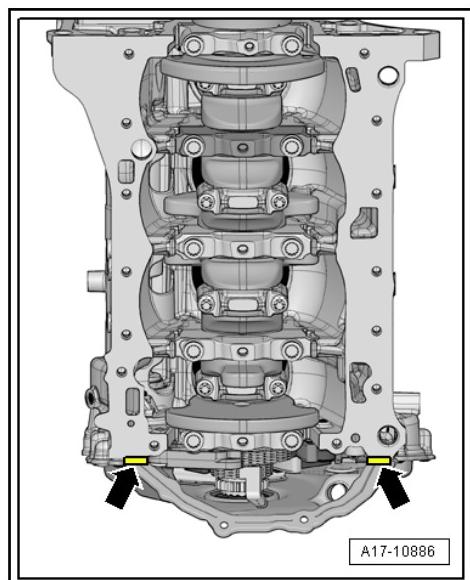


 Note

There is a risk that the lubrication system could be blocked by excess sealant. Do not apply sealant bead thicker than indicated.



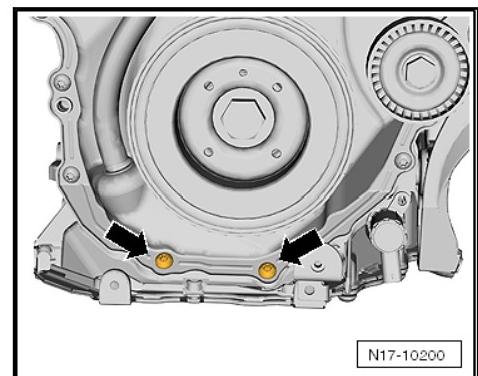
- Apply the silicone sealant on the clean sealing surface of the upper oil pan section as shown -arrows-.
- Sealant bead thickness: 2 to 3 mm.
- Apply the silicone sealant between the cylinder block and the lower timing chain cover as shown -arrows-.





Note

- ◆ The oil pan upper section must be installed within five minutes after applying the silicone sealant.
- ◆ The sealant bead may not be thicker than specified, otherwise excess sealant could enter the oil pan and clog the oil intake pipe screen.
- On the transmission side, the oil pan upper section and the crankcase must align.
- Position the upper section of the oil pan immediately and tighten the bolts, tightening sequence. Refer to [⇒ Fig. "Oil Pan Upper Section - Tightening Sequence"](#), page 208 .
- Install the bolts -arrows-. Tightening specifications -item 13- [⇒ Item 13 \(page 125\)](#)



- Install the sealing flange on the transmission side. Refer to [⇒ F2.5 lange, Removing and Installing, Transmission Side](#), page 71
- Install the oil pump. Refer to [⇒ P1.5 ump, Removing and Installing](#), page 215 .
- Insert the new oil baffle and secure it.
- Install the oil pan lower section. Refer to [⇒ P1.3 an Lower Section, Removing and Installing](#), page 209 .

Further assembly is performed in the reverse order of the removal.

- Fill the engine oil and check the oil level. Refer to ⇒ Maintenance; Booklet 20.2.

Tightening Specifications

- ◆ Refer to [⇒ -1.1 Oil Pan/Oil Pump](#), page 205

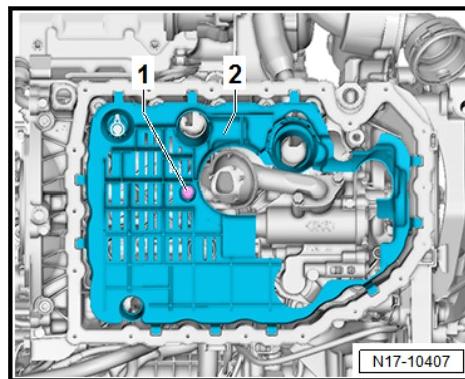
1.5 Oil Pump, Removing and Installing

Special tools and workshop equipment required

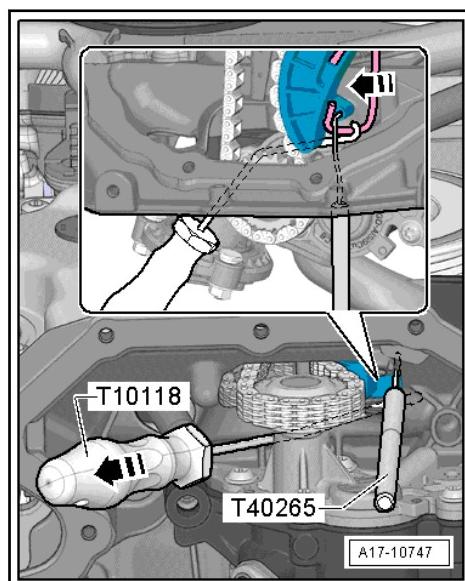
- ◆ Elbow Assembly Tool -T10118-
- ◆ Chain Tensioner Locking Tool -T40265-

Removing

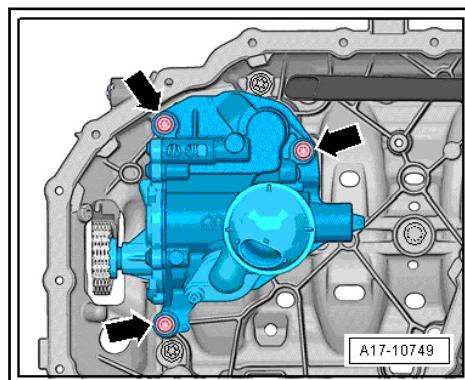
- Remove the oil pan lower section. Refer to [⇒ P1.3 an Lower Section, Removing and Installing](#), page 209 .
- Remove the bolt -1- and remove the oil baffle -2-.



- Pull the chain tensioner spring using the -T10118- in direction of -arrow- and secure it with the -T40265-.



- Remove the bolts -arrows- and the oil pump.



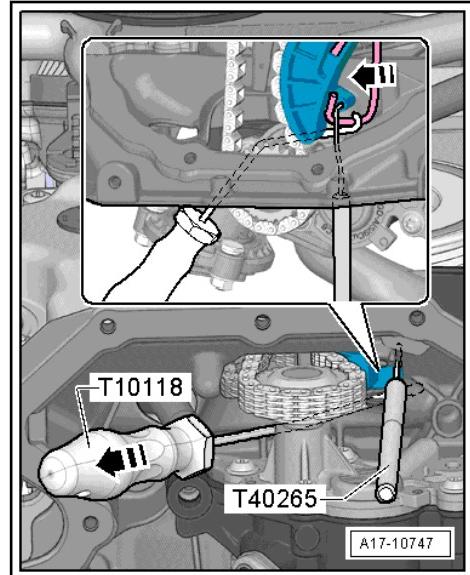
Installing

Install in reverse order of removal and note the following:

- Make sure there are both alignment bushings for centering the oil pump.
- Check the oil intake pipe screen and the oil channels in the oil pan upper section for contamination before installing the oil pump.
- Guide the oil pump chain sprocket into the drive chain and install the oil pump.



- Pull the chain tensioner spring with the -T10118- in the direction of -arrow- and remove the -T40265-.
- Slowly release the -T10118-.



- Place the O-ring -item 10- [Item 10 \(page 206\)](#) on the new oil baffle and coat with engine oil.
- Insert the new oil baffle and secure it.
- Install the oil pan lower section. Refer to [⇒ P1.3 an Lower Section, Removing and Installing](#), page 209 .
- Fill the engine oil and check the oil level. Refer to ⇒ Maintenance; Booklet 20.2.

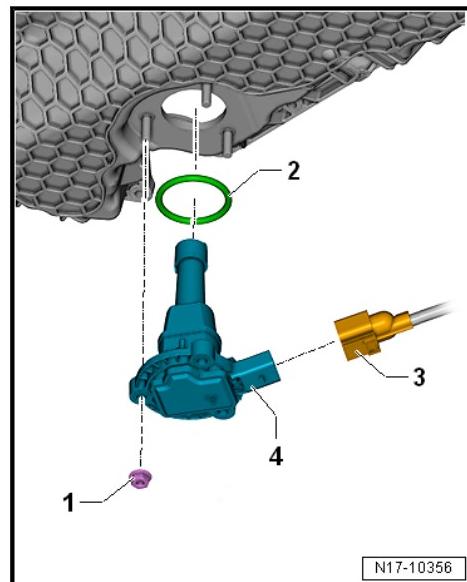
Tightening Specifications

- ◆ Refer to [⇒ -1.1 Oil Pan/Oil Pump](#), page 205

1.6 Oil Level Thermal Sensor -G266-, Removing and Installing

Removing

- The engine oil is drained. Refer to ⇒ Maintenance; Booklet 20.2; Procedure Descriptions; Engine Oil, Draining or Extracting, Changing Oil Filter and Filling Oil.
- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Disconnect the connector -3-.

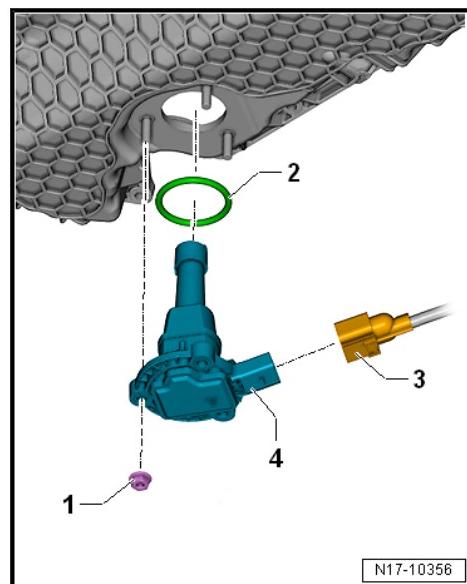


- Remove the nuts -1- and the Oil Level Thermal Sensor -G266- -4-.

Installing

Install in reverse order of removal and note the following:

- if O-ring -2- is damaged, replace the Oil Level Thermal Sensor -G266- -4-. O-ring not available separately.
- Fill with engine oil and then check the level. Refer to ⇒ Maintenance; Booklet 20.2; Procedure Descriptions; Engine Oil, Draining or Extracting, Changing Oil Filter and Filling Oil.



Tightening Specifications

- ◆ Refer to ⇒ -1.1 Oil Pan/Oil Pump", page 205



2 Engine Oil Cooler

[⇒ -2.1 Engine Oil Cooler", page 219](#)

[⇒ O2.2 oil Cooler, Removing and Installing", page 219](#)

[⇒ S2.3 switch Valve, Removing and Installing", page 221](#)

2.1 Overview - Engine Oil Cooler

1 - Sub-Assembly Bracket

- Removing and installing. Refer to [B1.5 bracket, Removing and Installing", page 58](#).

2 - Seal

- Replace after removing

3 - O-rings

- Replace after removing
- Coat with engine oil

4 - Mechanical Switch Valve

- Replacing. Refer to [S2.3 switch Valve, Removing and Installing", page 221](#).

5 - Engine Oil Cooler

- See note. Refer to [P1 fan/Oil Pump", page 205](#).
- Removing and installing. Refer to [O2.2 oil Cooler, Removing and Installing", page 219](#).

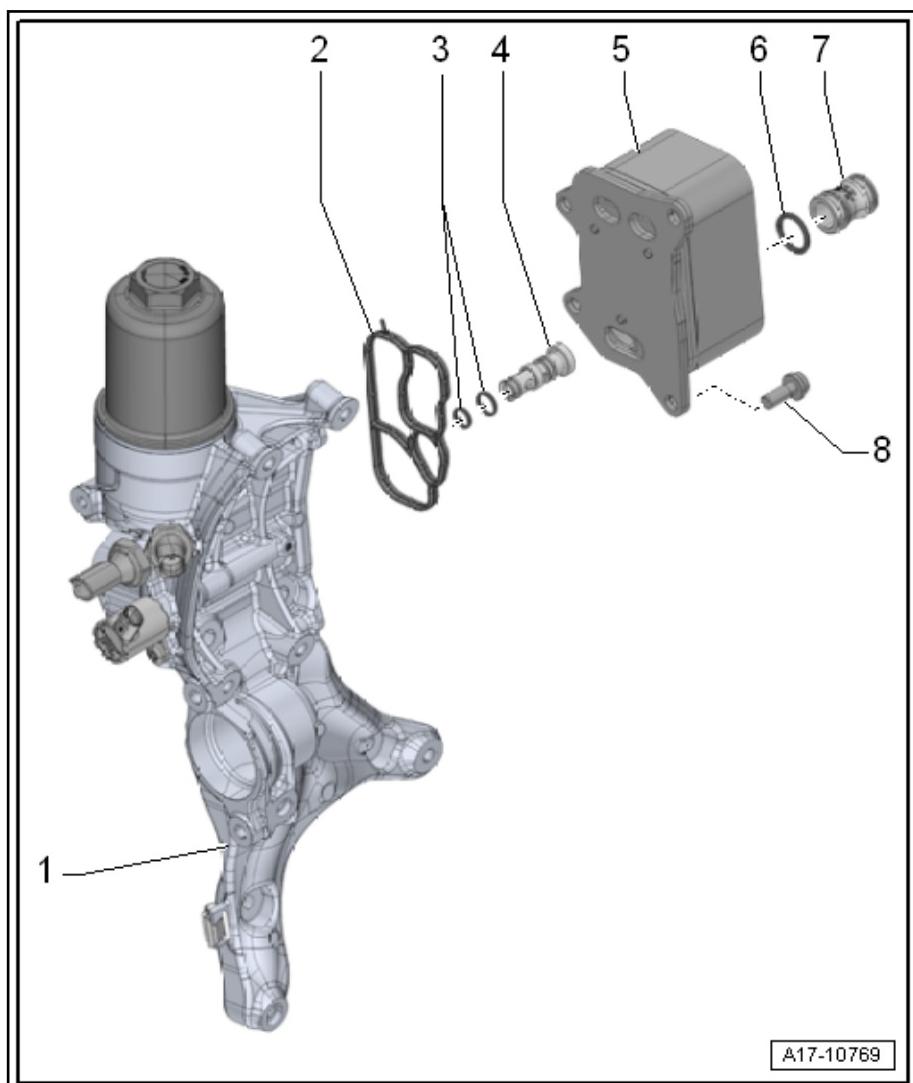
6 - Seal

- Replace after removing
- Coat with coolant

7 - Connection

8 - Bolt

- 8 Nm +45°
- Replace after removing



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2.2 Engine Oil Cooler, Removing and Installing

Special tools and workshop equipment required

- ◆ Shop Crane - Drip Tray -VAS6208-



Removing



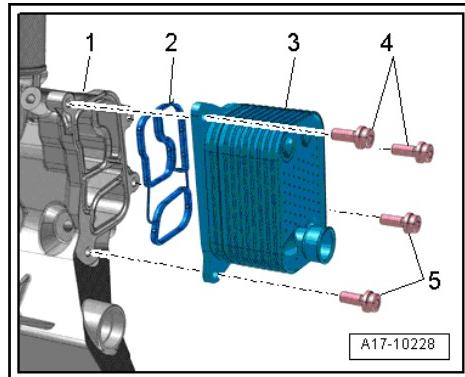
Caution

The cooling system is under pressure when the engine is warm. Risk of scalding due to hot steam and hot coolant.

Scalding the skin and other parts of the body is possible.

- Wear safety gloves.
- Wear protective eyewear.
- Reduce the pressure by covering the coolant expansion tank cap with a cloth and carefully opening it.

- Drain the coolant. Refer to [D1.3 draining and Filling](#), page [239](#).
- Remove the sub-assembly bracket. Refer to [B1.5 racket, Removing and Installing](#), page [58](#).
- Remove the bolts -4 and 5- and remove the engine oil cooler -3- together with the seal -2-.



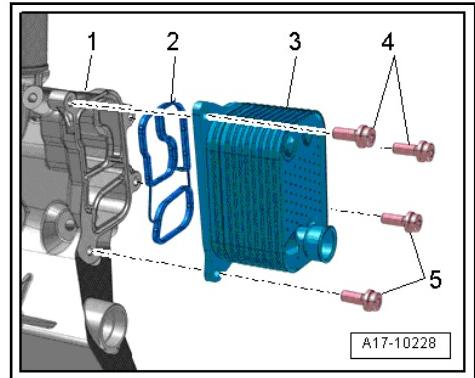
Installing

Install in reverse order of removal and note the following:



Note

- ◆ Replace the gaskets and seals.
 - ◆ Secure all hose connections with hose clamps that match the ones used in series production. Refer to the Parts Catalog.
- Install the engine oil cooler -3- with a new seal -2-.



- Install the sub-assembly bracket. Refer to [⇒ B1.5 racket, Removing and Installing](#), page 58 .
- Fill with coolant. Refer to [⇒ page 242](#) .
- Fill with engine oil and then check the level. Refer to ⇒ Maintenance; Booklet 20.2; Procedure Descriptions; Engine Oil, Draining or Extracting, Changing Oil Filter and Filling Oil.

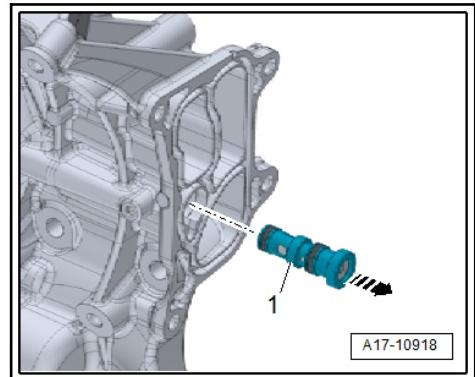
Tightening Specifications

- ◆ Refer to [⇒ -2.1 Engine Oil Cooler](#), page 219

2.3 Mechanical Switch Valve, Removing and Installing

Removing

- Remove the engine oil cooler. Refer to [⇒ O2.2 il Cooler, Removing and Installing](#), page 219 .
- Remove the mechanical switch valve -1- from the auxiliary components bracket in direction of -arrow-.



Installing

Install in reverse order of removal and note the following:

Note

- ◆ Replace the gaskets and seals.
- ◆ Secure all hose connections with hose clamps that match the ones used in series production. Refer to the Parts Catalog.
- Coat the mechanical switch valve O-rings with engine oil and install the switch valve.



- Install the engine oil cooler. Refer to [⇒ O2.2 oil Cooler, Removing and Installing](#), page 219 .



3 Crankcase Ventilation

[⇒ -3.1 Crankcase Ventilation", page 223](#)

[⇒ S3.2 eparator, Removing and Installing", page 224](#)

3.1 Overview - Crankcase Ventilation

1 - Cylinder Head Cover

2 - Seal

- Replace after removing

3 - Hose

- To the EVAP Canister Purge Regulator Valve 1 -N80-

4 - Oil Separator

- Removing and installing. Refer to [⇒ S3.2 eparator, Removing and Installing", page 224](#).

5 - Seal

- Replace after removing

6 - Hose

- For the crankcase ventilation
- To the Connecting Pipe -item 14- [⇒ Item 14 \(page 328\)](#)

7 - Bolt

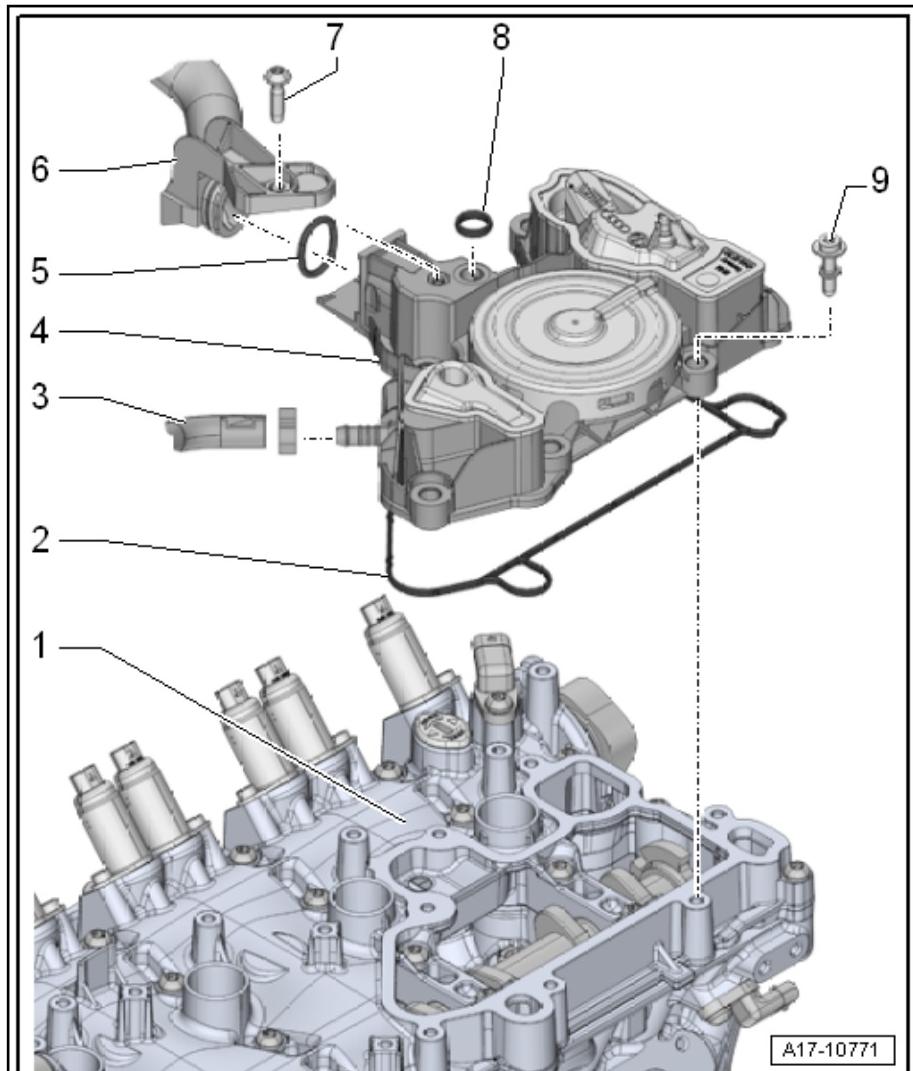
- 4 Nm
- Self-tapping
- Position the bolt by hand and tighten it until it finds the old threads. Then tighten the bolt to the specification.

8 - Seal

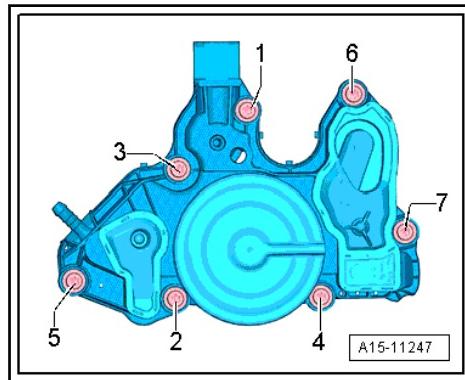
- Replace after removing

9 - Bolt

- Position the bolt by hand and tighten it until it finds the old threads. Then tighten the bolt to the specification.
- Tightening specification and sequence. Refer to [⇒ Fig. "Oil Separator - Tightening Sequence", page 223](#).
- Self-tapping



Oil Separator - Tightening Sequence



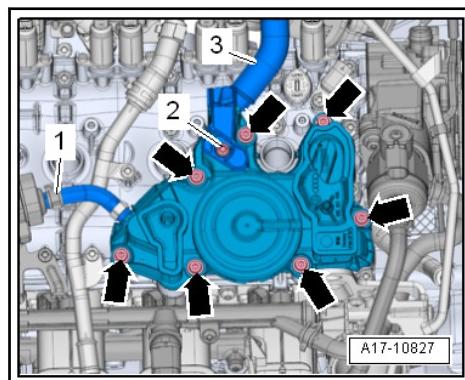
- Tighten the bolts in the sequence -1 through 7-.

Bolts	Tightening Sequence and Tightening Specification
-1 through 7-	9 Nm

3.2 Oil Separator, Removing and Installing

Removing

- Remove ignition coil cylinders "3 and 4". Refer to [C1.3 oils with Power Output Stages, Removing and Installing](#), page 386 .
- Loosen the hose clamp -1- and remove the hose from EVAP Canister Purge Regulator Valve 1 -N80-.



- Remove bolt -2- and then remove crankcase ventilation hose -3- from oil separator.
- Remove the bolts -arrows- and the oil separator.

Installing

Install in reverse order of removal and note the following:



- ◆ Always replace gasket and seals.
- ◆ Secure all hose connections with hose clamps that match the ones used in series production. Refer to the Parts Catalog.

Tightening Specifications

- ◆ Refer to [-3.1 Crankcase Ventilation](#), page 223



4 Oil Filter/Oil Pressure Switch

[⇒ 4.1 Oil Filter”, page 225](#)

[⇒ 4.2 Oil Pressure Switch/Oil Pressure Regulation Valve”, page 225](#)

[⇒ O4.3 Oil Pressure Switch F1, Removing and Installing”, page 227](#)

[⇒ R4.4 Reduced Oil Pressure Switch F378, Removing and Installing”, page 227](#)

[⇒ P4.5 Pressure and Oil Pressure Switch, Checking”, page 228](#)

[⇒ O4.6 Oil Pressure Regulation Valve N428, Removing and Installing”, page 232](#)

4.1 Overview - Oil Filter

1 - Sub-Assembly Bracket

- Removing and installing. Refer to ⇒ [B1.5 Racket, Removing and Installing”, page 58](#).

2 - Seal

- Replace after removing

3 - Oil Filter

- Removing and installing. Refer to ⇒ Maintenance; Booklet 20.2.

4 - O-ring

- Replace after removing
- Coat with engine oil

5 - Oil Filter Housing

- 25 Nm

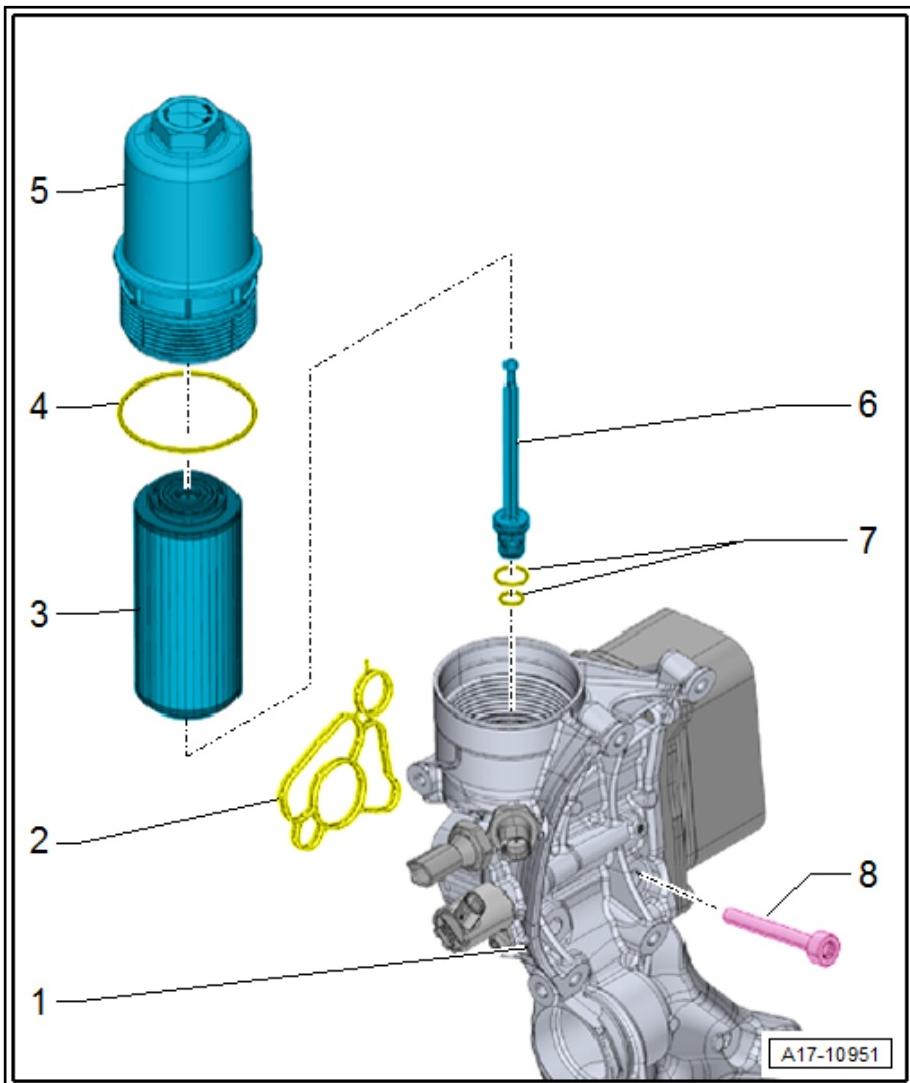
6 - Oil Drain Supports

7 - O-rings

- Replace after removing
- Part of delivery package -5-

8 - Bolt

- Tightening specification and sequence. Refer to ⇒ [Fig. “Sub-Assembly Bracket - Tightening Specifications and Sequence”, page 49](#).



4.2 Overview - Oil Pressure Switch/Oil Pressure Regulation Valve



1 - Bolt

- 4 Nm +90°
- Replace after removing

2 - Oil Pressure Regulation Valve -N428-

- Removing and installing. Refer to [O4.6 il Pressure Regulation Valve N428, Removing and Installing](#), page 232 .

3 - O-ring

- Replace after removing
- Coat with engine oil

4 - O-rings

- Not Installed

5 - Bolt

- Not Installed

6 - Piston Cooling Nozzle Control Valve -N522-

- Not Installed

7 - Seal

- Replace after each time oil pressure switch is loosened

8 - Oil Pressure Switch -F1-

- 20 Nm
- Removing and installing. Refer to [O4.3 il Pressure Switch F1, Removing and Installing](#), page 227 .
- Blue or gray insulation
- Checking. Refer to Vehicle Diagnostic Tester.

9 - Reduced Oil Pressure Switch -F378-

- 20 Nm
- Brown insulation
- Checking. Refer to Vehicle Diagnostic Tester.
- Removing and installing. Refer to [R4.4 educed Oil Pressure Switch F378, Removing and Installing](#), page 227 .

10 - Seal

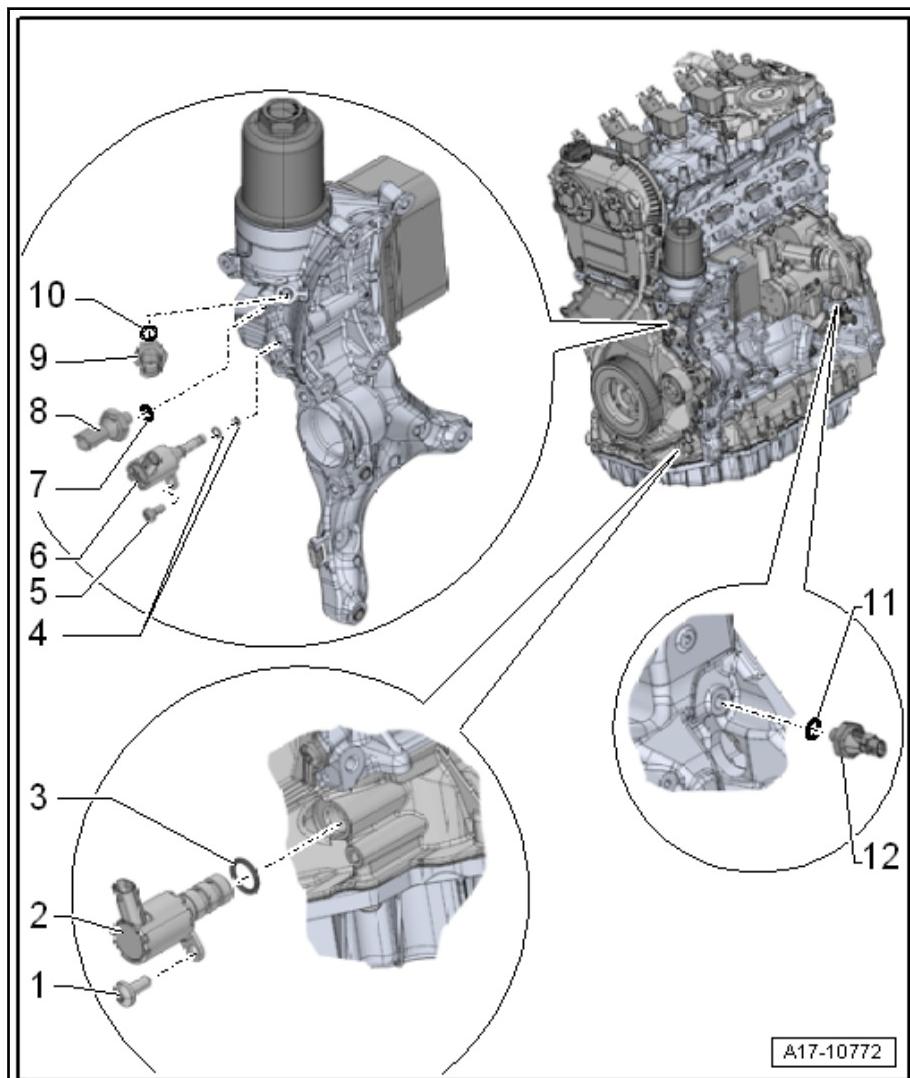
- Replace after each time oil pressure switch is loosened

11 - Seal

- Not installed

12 - Oil Pressure Switch, Level 3 -F447-

- Not installed





4.3 Oil Pressure Switch -F1-, Removing and Installing

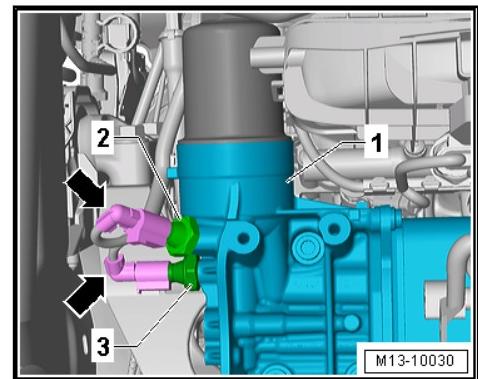
Special tools and workshop equipment required

- ◆ Socket and Jointed Extension - 24mm -T40175-

Removing

Note

- ◆ Place a cloth under the accessory assembly bracket to collect leaking engine oil.
- ◆ Replace the seal after each time the oil pressure switch is loosened.
- Disconnect the connector -bottom arrow- for the Oil Pressure Switch -F1- -3-.



- Remove the Oil Pressure Switch - F1- -3-.

Installing

Install in reverse order of removal and note the following:

Replace the seal after each time the oil pressure switch is loosened.

- Check the oil level. Refer to ⇒ Maintenance; Booklet 20.2.

Note

- ◆ Replace the seal.
- ◆ To prevent oil loss, insert the new Oil Pressure Switch -F1- in the opening immediately.

Tightening Specifications

- ◆ Refer to ⇒ [-4.2 Oil Pressure Switch/Oil Pressure Regulation Valve](#), page 225 .

4.4 Reduced Oil Pressure Switch -F378-, Removing and Installing

Special tools and workshop equipment required

- ◆ Socket and Jointed Extension - 24mm -T40175-

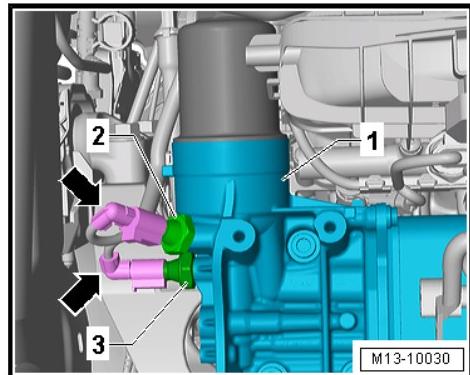


Removing



Note

- ◆ Place a cloth under the accessory assembly bracket to collect leaking engine oil.
- ◆ Replace the seal after each time the oil pressure switch is loosened.
- Disconnect the connector -top arrow- for the Reduced Oil Pressure Switch -F378- -2-.
- Remove the Reduced Oil Pressure Switch -F378- -2-.



Installing

Install in reverse order of removal and note the following:

Replace the seal after each time the oil pressure switch is loosened.

- Check the oil level. Refer to ⇒ Maintenance; Booklet 20.2.

Tightening Specifications

- ◆ Refer to [⇒ 4.2 Oil Pressure Switch/Oil Pressure Regulation Valve](#), page 225

4.5 Oil Pressure and Oil Pressure Switch, Checking

Special tools and workshop equipment required

- ◆ Oil Pressure Gauge Kit -VAG1342-

Socket and Jointed Extension - 24mm -T40175-

Test Prerequisites

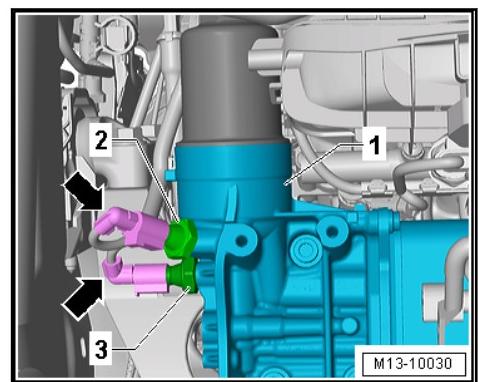
- Oil level OK
- The engine oil temperature at least 80 °C (176 °F) (the Radiator Fan must start up once).



Note

- ◆ The oil pump is regulated and has two pressure stages. The pressure stages are checked one after the other.
- ◆ During the break-in phase (approximately 1000 km (621.37 miles)) or in engine emergency running mode the oil pump only pumps in the higher pressure stage.
- ◆ The oil pressure depends on the engine oil temperature. At an engine oil temperature of 80 °C (176 °F) approximately the average must be reached.
- After installing new parts (engine/partial engine, cylinder head or turbocharger) limit the oil pressure regulation for approximately 1000 km (621.37 miles) to the higher pressure stage. From this, the higher friction is taken into account when breaking in new components, and the optimum removal of particles from the initial wear in is ensured. To do this connect the vehicle diagnostic tester, switch on the ignition and select the following menu items:
 - ◆ 01 - Engine electronics
 - ◆ Guided Functions
 - ◆ 01 - Oil Pressure Regulation/Retraction Activating

Test Sequence



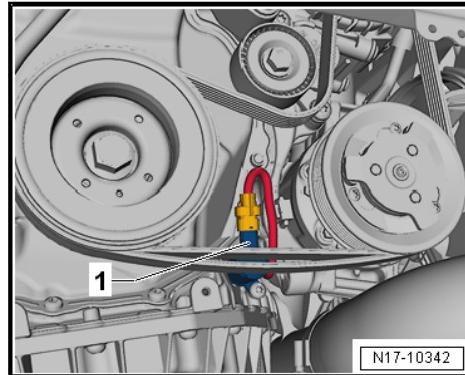
- Disconnect the electrical connector -arrow- on the Reduced Oil Pressure Switch -F378-.
- Place a cloth under the accessory assembly bracket to collect leaking engine oil.
- Remove the Reduced Oil Pressure Switch -F378- -2-.
- Install the -VAG1342- into the oil filter bracket in place of the oil pressure switch.
- Push the Reduced Oil Pressure Switch -F378- in the -VAG1342- and connect the connector.
- Connect the -VAG1342- to the ground.
- Start the engine and check the oil pressure of the specified RPMs.
 - Oil pressure at idle: 0.9 to 2.4 bar (13.05 to 34.80 psi)
 - Oil pressure at 2000 RPM: 2.0 to 2.4 bar (29 to 34.8 psi)
 - Oil pressure at 3700 RPM: 3.0 to 4.3 bar (43.5 to 62.36 psi)
- Turn off the engine.



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4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

- Remove the noise insulation. Refer to [⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation](#).
- Remove the connector -1- from the Oil Pressure Regulation Valve -N428-. Unclip the cable and route downward so that it is not in the belt drive unit. With the connector removed the oil pump only pumps in the higher pressure stage.



- Start the engine and check the oil pressure of the specified RPMs.
 - Oil pressure at idle: 0.9 to 4.3 bar (13.05 to 62.36 psi)
 - Oil pressure at 2000 RPM: 3.0 to 4.3 bar (43.5 to 62.36 psi)
 - Oil pressure at 3700 RPM: 3.0 to 4.3 bar (43.5 to 62.36 psi)

If the specified value is not obtained:

- Check the oil intake pipe screen for contamination -item 11- [⇒ Item 11 \(page 206\)](#).
- Check the Oil Pressure Regulation Valve -N428-. Refer to [Vehicle Diagnostic Tester](#).



Note

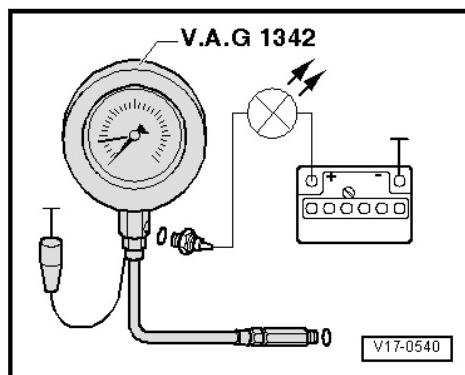
Also, mechanical damage, for example, bearing damage can also be the cause of too low oil pressure.

If no error can be found:

- Replace the oil pump. Refer to [⇒ P1.5 ump, Removing and Installing](#), page 215 .

Checking the Reduced Oil Pressure Switch -F378- (Brown):

- Switch the engine off.



- Connect the brown wire on the tester to the ground (-).



- Connect the -VAS6839- with adapter cable from the -VAG1594D- to the battery positive (+) and the Reduced Oil Pressure Switch -F378- (brown).
- The LED must not turn on.
- If the LED illuminates, replace the Reduced Oil Pressure Switch -F378-.

If the LED does not turn on:

- Start the engine: the LED must come on at 0.55 to 0.85 bar (7.97 to 12.32 psi). If it does not, replace the oil pressure switch.

Oil Pressure Switch -F1- (Blue), Checking:

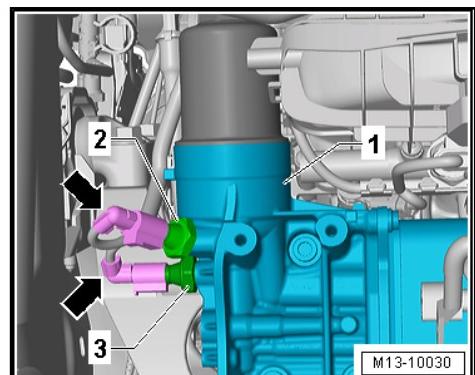
- Switch the engine off.
- Connect the -VAS6839- to battery positive (+) and the Oil Pressure Switch -F1- (blue) using the adapter cable from the -VAG1594D-.
- The LED must not turn on.
- If the LED illuminates, replace the Oil Pressure Switch -F1-.

If the LED does not turn on:

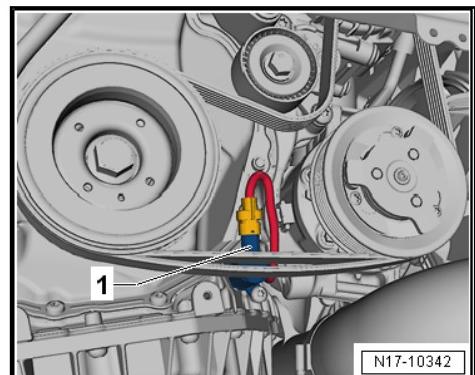
- Start the engine and increase the RPM: the LED must come on at 2.15 to 2.95 bar (31.18 to 42.78 psi) pressure; if not, then replace the oil pressure switch.

Assembling

- Install the Oil Pressure Switch -F1- -2- and connect the connector -arrow-.



- Connect the connector -1- to the Oil Pressure Regulation Valve -N428-. Carefully route the cable.



- Install the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.



- Check the engine control module DTC memory and erase any entries.

Tightening Specifications

- ◆ Refer to [⇒ -4.2 Oil Pressure Switch/Oil Pressure Regulation Valve](#), page 225 .

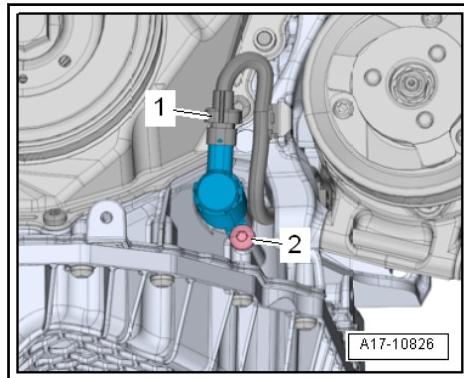
4.6 Oil Pressure Regulation Valve -N428-, Removing and Installing

Special tools and workshop equipment required

- ◆ Used Oil Collection and Extraction Unit -SMN372500-

Removing

- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Remove the ribbed belt. Refer to [⇒ B1.2 elt, Removing and Installing](#), page 49 .
- Place the -SMN372500- under the engine.
- Disconnect the connector -1-.
- Remove the bolt -2- and the Oil Pressure Regulation Valve -N428- -3-.



Installing

Install in reverse order of removal and note the following:

- Replace the O-rings after removing them.

Tightening Specifications

- ◆ Refer to [⇒ -4.2 Oil Pressure Switch/Oil Pressure Regulation Valve](#), page 225 .



5 Special Tools

Special tools and workshop equipment required

- ◆ Used Oil Collection and Extraction Unit -SMN372500-

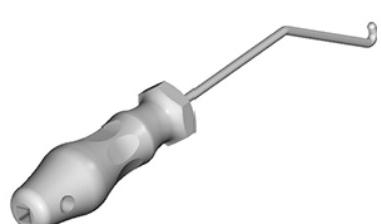
VAS 6622 A



W00-11526

- ◆ Elbow Assembly Tool -T10118-

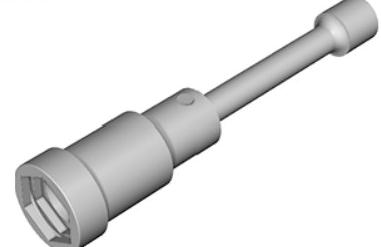
T10118



W00-11303

- ◆ Socket and Jointed Extension - 24mm -T40175-

T40175



W00-11242

- ◆ Chain Tensioner Locking Tool -T40265-

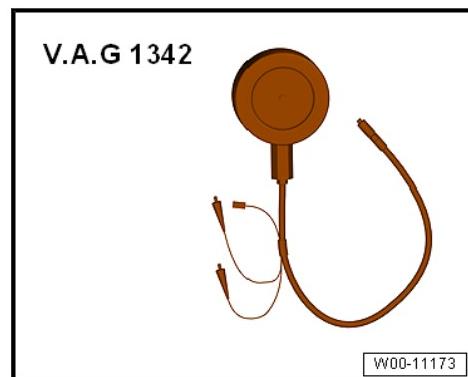
T40265



W00-11281



- ◆ Oil Pressure Gauge Kit -VAG1342-



W00-11173

- ◆ Shop Crane - Drip Tray -VAS6208-



W00-11209

- ◆ Hand Drill with Plastic Brush Attachment
- ◆ Protective Eyewear
- ◆ Silicone sealant. Refer to Parts Catalog.



19 – Cooling System

1 Coolant System/Coolant

⇒ [D1.1 iagram - Coolant Hoses", page 235](#)

⇒ [S1.2 ystem, Checking for Leaks", page 237](#)

⇒ [D1.3 raining and Filling", page 239](#)

1.1 Connection Diagram - Coolant Hoses

⇒ [H1.1.1 ose Connection Diagram, without Coolant Auxiliary Cooler", page 235](#)

⇒ [H1.1.2 ose Connection Diagram, with Coolant Auxiliary Cooler", page 236](#)

1.1.1 Coolant Hose Connection Diagram, without Coolant Auxiliary Cooler



1 - Coolant Expansion Tank

2 - Coolant Expansion Tank Cap

- Checking the pressure relief valve. Refer to [page 239](#).

3 - Turbocharger

4 - Exhaust Manifold

- Integrated in cylinder head

5 - Cylinder Head/Cylinder Block

- Change the coolant after replacing

6 - Heater Core for the Heater

- Change the coolant after replacing

7 - Coolant Pump

- Refer to [P2.5 umps, Removing and Installing](#), page 255

8 - Transmission Fluid Cooler

9 - Engine Coolant Temperature Sensor -G62-

10 - Coolant Thermostat Housing, Removing and Installing

- Refer to [T2.7 hermostat Housing, Removing and Installing](#), page 258

11 - Radiator

- Change the coolant after replacing
- Refer to [R4.4 emoving and Installing](#), page 272

12 - Charge Air Cooler

13 - Block Heater

- Equipment levels

14 - Engine Coolant Temperature Sensor on Radiator Outlet -G83-

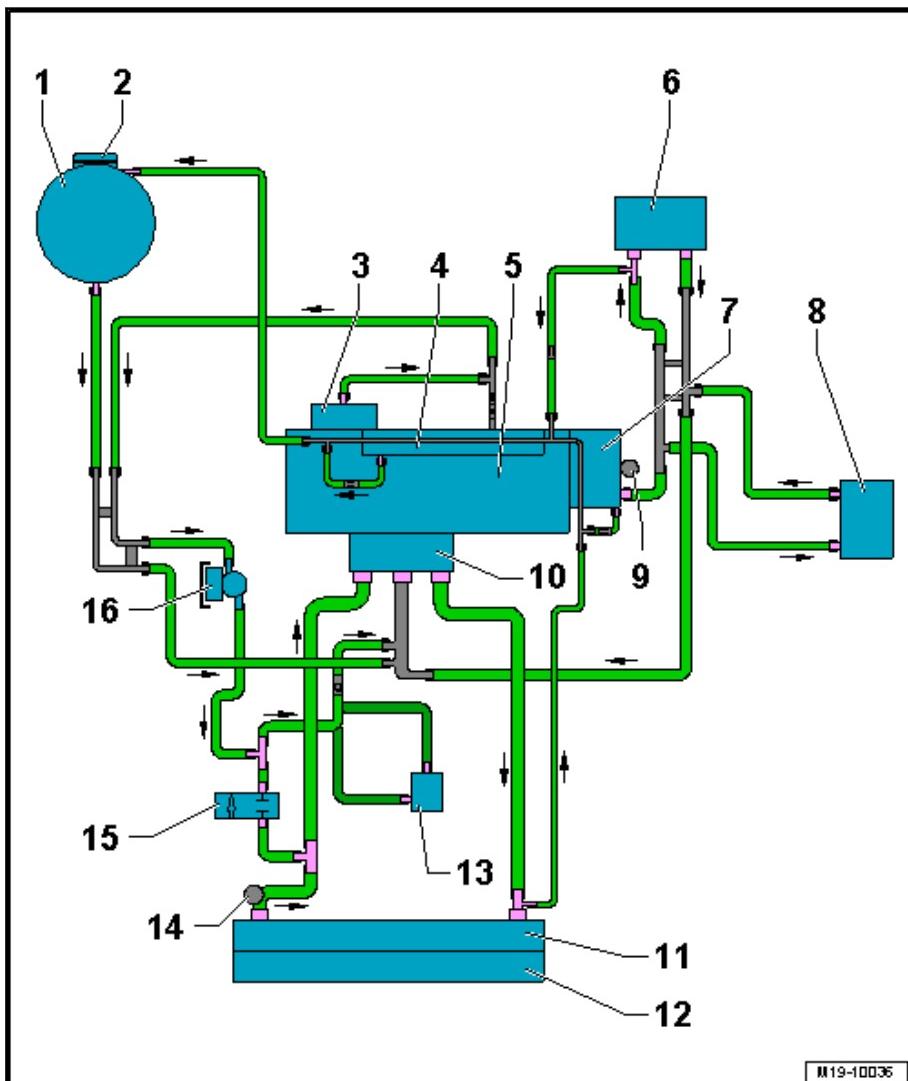
- Refer to [E2.9 ngine Coolant Temperature Sensor on Radiator Outlet G83, Removing and Installing](#), page 262

15 - Coolant Recirculation Pump

- Equipment levels

16 - After-Run Coolant Pump -V51-

- Refer to [A2.4 fter-Run Coolant Pump V51, Removing and Installing](#), page 252

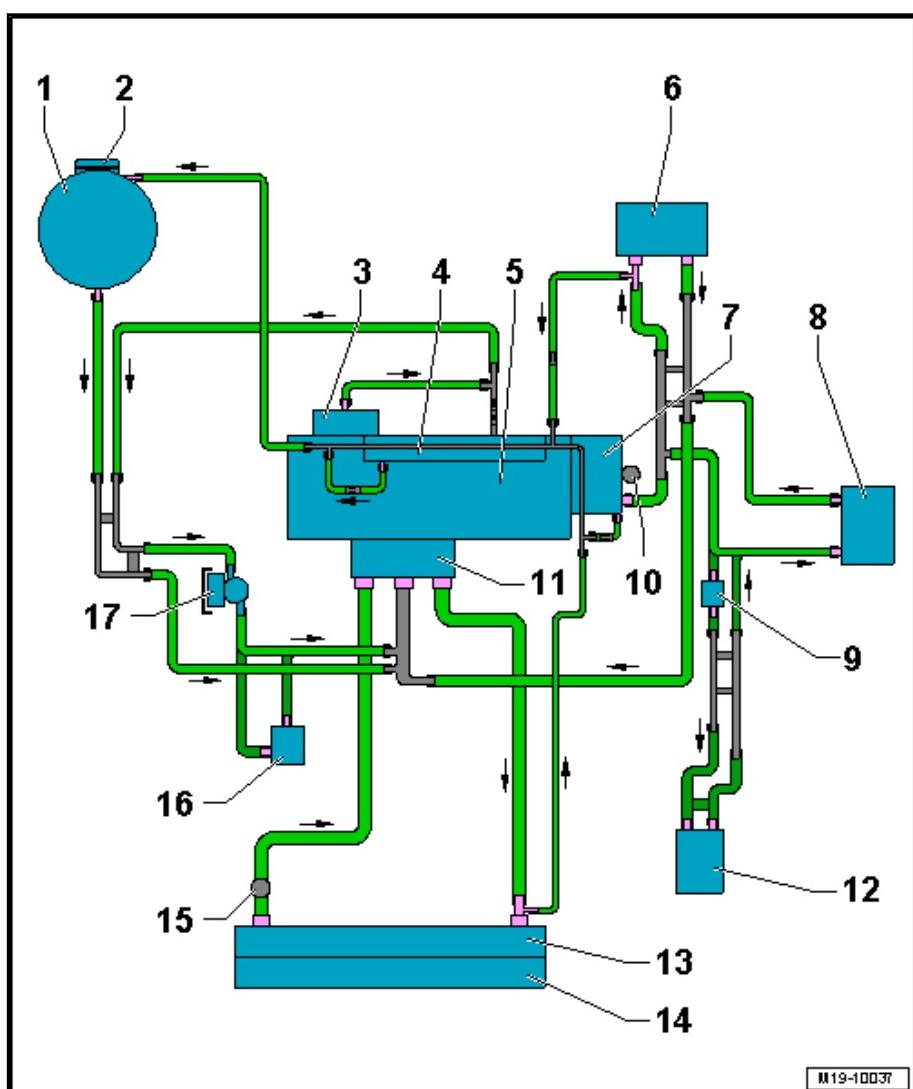


M19-10036

1.1.2 Coolant Hose Connection Diagram, with Coolant Auxiliary Cooler



- 1 - Coolant Expansion Tank
 2 - Coolant Expansion Tank Cap
 Checking the pressure relief valve. Refer to [page 239](#).
 3 - Turbocharger
 4 - Exhaust Manifold
 Integrated in cylinder head
 5 - Cylinder Head/Cylinder Block
 Change the coolant after replacing
 6 - Heater Core for the Heater
 Change the coolant after replacing
 7 - Coolant Pump
 Refer to [P2.5 ump, Removing and Instal-ling](#), page 255
 8 - Transmission Fluid Cooler
 9 - Thermostat
 Not installed on all vehicles
 10 - Engine Coolant Temperature Sensor -G62-
 11 - Coolant Thermostat Housing, Removing and Installing
 Refer to [T2.7 hermo-stat Housing, Remov-ing and Installing](#), page 258



- 12 - Auxiliary Cooler
 Refer to [C4.7 ooler, Removing and Installing](#), page 274
 13 - Radiator
 Change the coolant after replacing
 Refer to [R4.4 emoving and Installing](#), page 272
 14 - Charge Air Cooler
 15 - Engine Coolant Temperature Sensor on Radiator Outlet -G83-
 Refer to [E2.9 ngine Coolant Temperature Sensor on Radiator Outlet G83, Removing and Installing](#), page 262
 16 - Block Heater
 Equipment levels
 17 - After-Run Coolant Pump -V51-
 Refer to [A2.4 fter-Run Coolant Pump V51, Removing and Installing](#), page 252

1.2 Cooling System, Checking for Leaks

Special tools and workshop equipment required

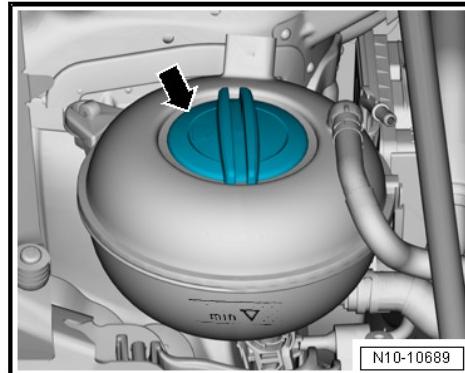


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4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

- ◆ Cooling System Tester -VAG1274B-
- ◆ Cooling System Tester - Adapter -VAG1274/8-
- ◆ Cooling System Tester - Adapter -VAG1274/9-

Procedure



N10-10689

- Engine at operating temperature.



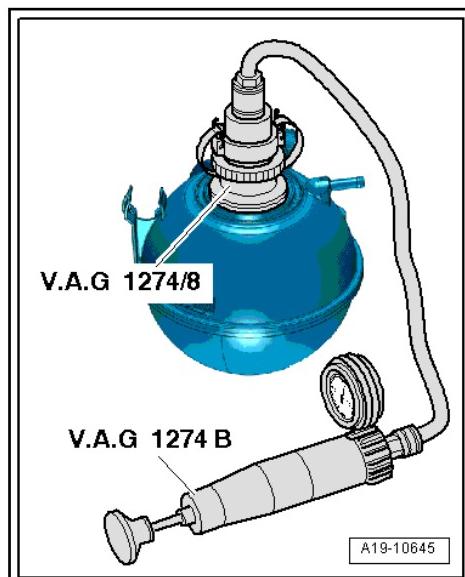
Caution

The cooling system is under pressure when the engine is warm. Risk of scalding due to hot steam and hot coolant.

Scalding the skin and other parts of the body is possible.

- *Wear safety gloves.*
- *Wear protective eyewear.*
- *Reduce the pressure by covering the coolant expansion tank cap with a cloth and carefully opening it.*

- Remove the coolant expansion tank cap -arrow-.
- Position the -VAG1274B- with the -VAG1274/8- on the coolant expansion tank.



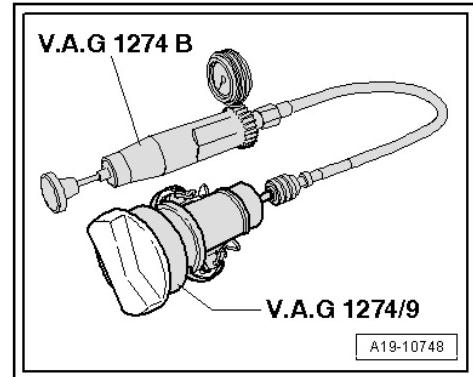
A19-10645

- Generate approximately 1 bar (14.5 psi) pressure using the cooling system tester hand pump.



- If the pressure falls, search for leaks and correct the problem.

Pressure Relief Valve in Cap, Checking

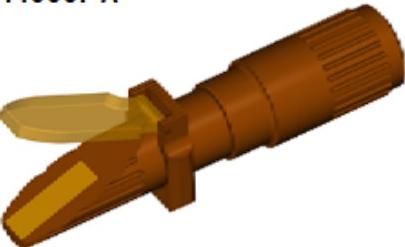
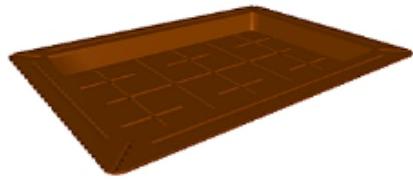
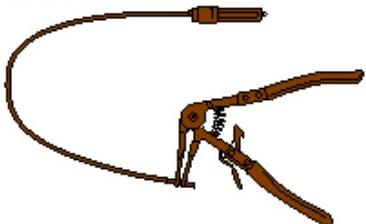
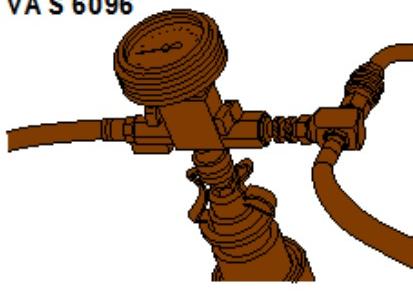


- Position the -VAG1274B- with the -VAG1274/9- on the cap.
- Generate pressure with the cooling system tester hand pump.
- The pressure release valve must open at 1.6 to 1.8 bar (23.2 to 26.1 psi).
- If pressure relief valve does not open as specified, replace the cap.

1.3 Coolant, Draining and Filling



Special tools and workshop equipment required

T10007 A		VA S 6208	
VA S 6340		VA S 6096	
V.A.G 1274/8			W19-10066

- ◆ Refractometer -T10007 A-
- ◆ Shop Crane - Drip Tray -VAS6208-
- ◆ Hose Clip Pliers -VAS6340-
- ◆ Cooling System Charge Kit -VAS6096-
- ◆ Cooling System Tester - Adapter -VAG1274/8-
- ◆ Protective Eyewear
- ◆ Safety Gloves



Draining



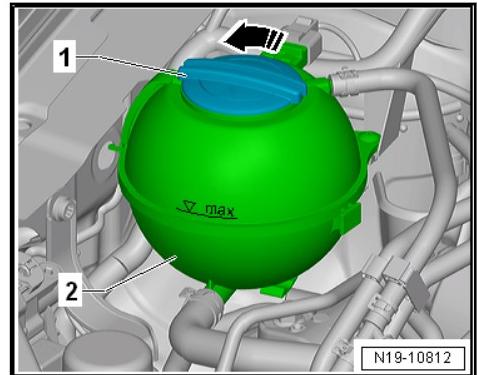
Caution

The cooling system is under pressure when the engine is warm. There is a risk of scalding due to hot steam and hot coolant.

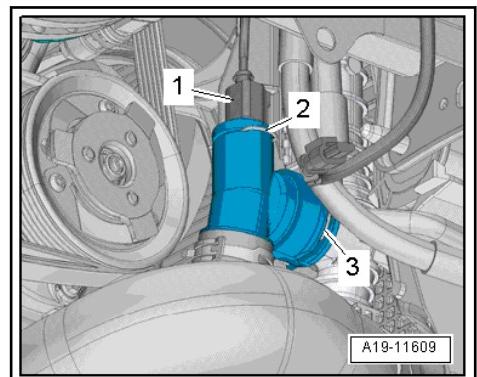
Scalding the skin and other parts of the body is possible.

- Wear safety gloves.
- Wear protective eyewear.
- Reduce the pressure by covering the coolant expansion tank cap with a cloth and carefully opening it.

- Carefully open the cap -1- on the coolant expansion tank -2- in the -direction of the arrow-.



- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Place the Shop Crane - Drip Tray -VAS6208- underneath.
- Disconnect the connector -2- on the Engine Coolant Temperature Sensor on Radiator Outlet -G83-.



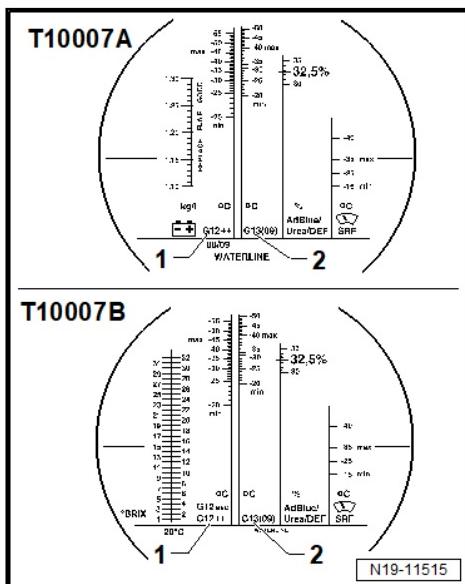
- Lift the clamp -3- and remove the lower right coolant hose from the radiator. Allow the coolant to drain.



Filling

**Note**

- ◆ Distilled water must be used to mix the coolant concentrate due to country and region specific differences in the contents in tap water.
- ◆ Only use coolant additives approved for the vehicle. Refer to → Electronic Parts Catalog (ETKA). Other coolant additives may above all reduce the corrosion protection effect significantly. The damage resulting from this may lead to loss of coolant and consequently to severe engine damage.
- ◆ Coolant with the correct mixture ratio prevents freezing and corrosion damage and calcium deposits. Additionally, the boiling temperature will be raised. For this reason the cooling system must be filled with coolant additive year-round.
- ◆ Because of its high boiling point, the coolant contributes to engine reliability under heavy engine loads, particularly in countries with tropical climates.
- ◆ To determine the current freeze protection value, use the Refractometer -T10007A- or Analog Refractometer -T10007B-.



- ◆ The scale -1- on the refractometer refers to the coolant additives G12++ and G12evo.
- ◆ The scale -2- on the refractometer refers to the coolant additive G13.
- ◆ If the type of coolant additive cannot be determined, always use the G13 scale to determine freeze protection.
- ◆ Freeze protection must be assured down to minimum -25 °C (-13 °F) (in arctic climatic countries down to approximately -36 °C (-32.8 °F)). The freeze protection may only be increased, when stronger freeze protection is needed due to the climate. But only down to -48 °C (-54 °F), otherwise the effectiveness of the coolant decreases.
- ◆ The coolant concentration must not be reduced by adding water even in warmer seasons and in warmer countries. The frost protection must be at least -25 °C (-13 °F).
- ◆ The temperature on the Refractometer corresponds to the »freezing point«. At this temperature, ice crystals may begin to form in the coolant.



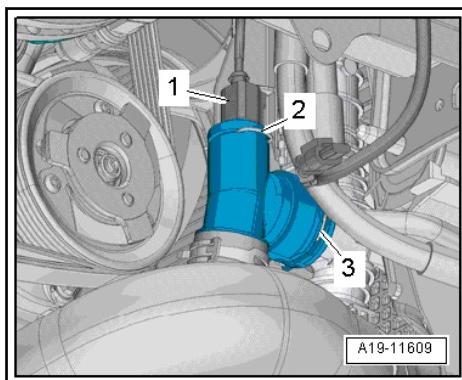
- ◆ Used coolant cannot be used again.
- ◆ Only use water/coolant additive to lubricate the coolant hoses.

Coolant Mixture Ratio

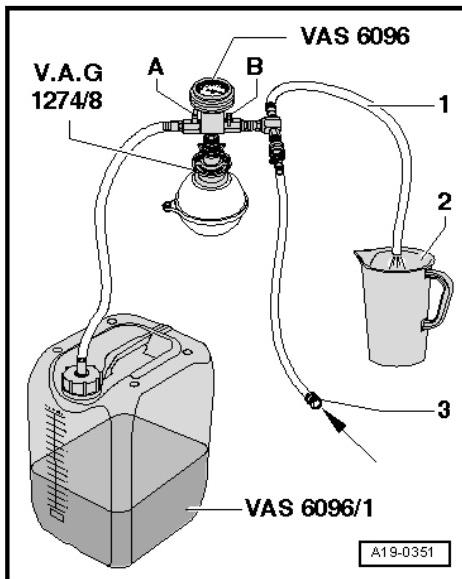
Frost protection to	Portion of coolant additive	Coolant additive ¹⁾	Distilled water ¹⁾
-25 °C (-13 °F)	40 %	3.2L	4.8L
-36 °C (-32.8 °F))	50 %	4.0L	4.0L

¹⁾ The amount of coolant may vary depending on vehicle equipment.

- Coolant. Refer to the ⇒ Electronic Parts Catalog (ETKA).
- Connect the coolant hose to the connector coupling -3- on the lower right side of the radiator.



- Fill the Cooling System Charge Kit - Reservoir -VAS6096/1- on the Cooling System Charge Kit -VAS6096- with at least 10 liters of premixed coolant.



- Use the proper mixture ratio of coolant.
- Install the Cooling System Tester - Adapter -VAG1274/8- on the coolant expansion tank.
- Mount the Cooling System Charge Kit -VAS6096- on the Cooling System Tester - Adapter -VAG1274/8-.

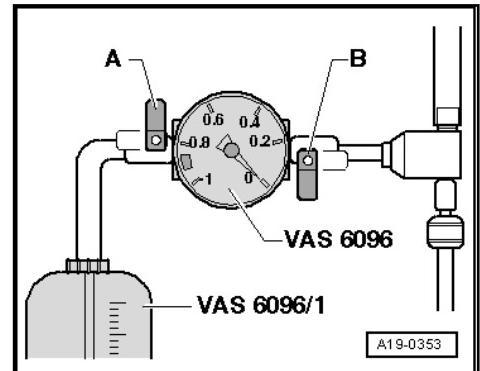


- Place the drain hose -1- in a small container -2-.

Note

A small amount of coolant which should be collected is drawn off with the discharged air.

- Close the valves -A- and -B- by turning lever at a right angle to the flow direction.
- Connect the hose -3- to compressed air.
- Pressure: 6 to 10 bar positive pressure.
- Open the valve -B- by turning the lever in the flow direction.



- A further vacuum is created in the cooling system by the suction jet pump.
- The needle on the instrument display must travel into the green region.
- Open the valve -A- for a moment.
- To do this, turn the lever in the direction of flow so that the Replacement Reservoir -VAS6096/1- hose fills with coolant.
- Close the valve -A- again.
- Leave the valve -B- open another two minutes.
- A further vacuum is created in the cooling system by the suction jet pump.
- Needle on the instrument display must still remain in the green region.
- Close the valve -B-.
- The needle on display must remain in the green range.
- Only then is there enough vacuum in the coolant system for the filling.

Note

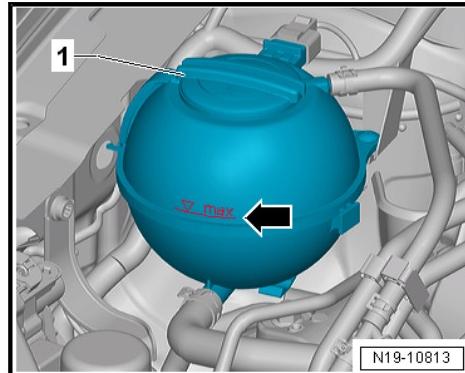
- ◆ Repeat the procedure if the needle goes below the green range.
- ◆ Check the cooling system for leaks if the pressure drops.
- Remove the pressure hose.
- Open the valve -A-.



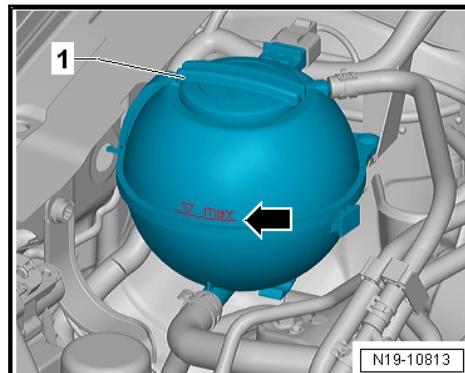
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4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

- Due to the vacuum in the cooling system, coolant is extracted from the Cooling System Charge Kit - Reservoir -VAS6096/1- and the cooling system is filled.
- Remove the Cooling System Charge Kit -VAS6096- from the coolant expansion tank.
- Fill up the coolant expansion tank -1- with coolant to the "max" marking -arrow-.



- Install the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- If the vehicle has a parking heater, switch it on for about 30 seconds.
- Set the temperature to "HI".
- Press **AC** to turn off the A/C compressor.
- The LED in the button must not come on.
- Start the engine and run it at approximately 1500 RPM for a maximum of two minutes.
- With engine running, fill coolant up to overflow hole on coolant expansion tank.
- Close the cap on the coolant expansion tank until it locks into place.
- Allow the engine to run at idle until both large coolant hoses on the radiator are warm.
- Turn off engine and allow it to cool off.
- Check the coolant level in the coolant expansion tank -1-.



- The coolant level must be between the "min" and "max" markings when the engine is cold.
- The coolant level may be at the "max" marking -arrow- when the engine is warm.



- If necessary, fill the coolant again.



2 Coolant Pump/THERMOSTAT

- ⇒ [-2.1 Coolant Pump/THERMOSTAT", page 248](#)
- ⇒ [-2.2 Electric Coolant Pump", page 250](#)
- ⇒ [-2.3 Engine Coolant Temperature Sensor", page 251](#)
- ⇒ [A2.4 After-Run Coolant Pump V51, Removing and Installing", page 252](#)
- ⇒ [P2.5 Pump, Removing and Installing", page 255](#)
- ⇒ [P2.6 Pump Toothed Belt, Removing and Installing", page 256](#)
- ⇒ [T2.7 Thermostat Housing, Removing and Installing", page 258](#)
- ⇒ [E2.8 Engine Coolant Temperature Sensor G62, Removing and Installing", page 261](#)
- ⇒ [E2.9 Engine Coolant Temperature Sensor on Radiator Outlet G83, Removing and Installing", page 262](#)

2.1 Overview - Coolant Pump/THERMOSTAT

**1 - Connection****2 - O-ring**

- Replace after removing
- Coat with coolant

3 - Bolt

- Tightening specification and sequence. Refer to [Fig. "Thermostat - Tightening Specification and Tightening Sequence"](#), page 250 .

4 - Centering Pin**5 - Seal**

- Replace after removing

6 - Seal

- Replace after removing

7 - Coolant Pump

- Removing and installing. Refer to [P2.5 ump, Removing and Installing](#), page 255 .
- For a new coolant pump, remove the protective cap

8 - Bolt

- Tightening sequence. Refer to [Fig. "Coolant Pump - Tightening Specification and Sequence"](#), page 250 .

9 - Bolt

- 9 Nm

10 - Toothed Belt

- For the coolant pump
- Removing and installing. Refer to [P2.6 ump Toothed Belt, Removing and Installing](#) .

11 - Toothed Belt Guard**12 - Bolt**

- 10 Nm +90°
- Replace after removing
- Left-hand thread

13 - Toothed Belt Drive Gear

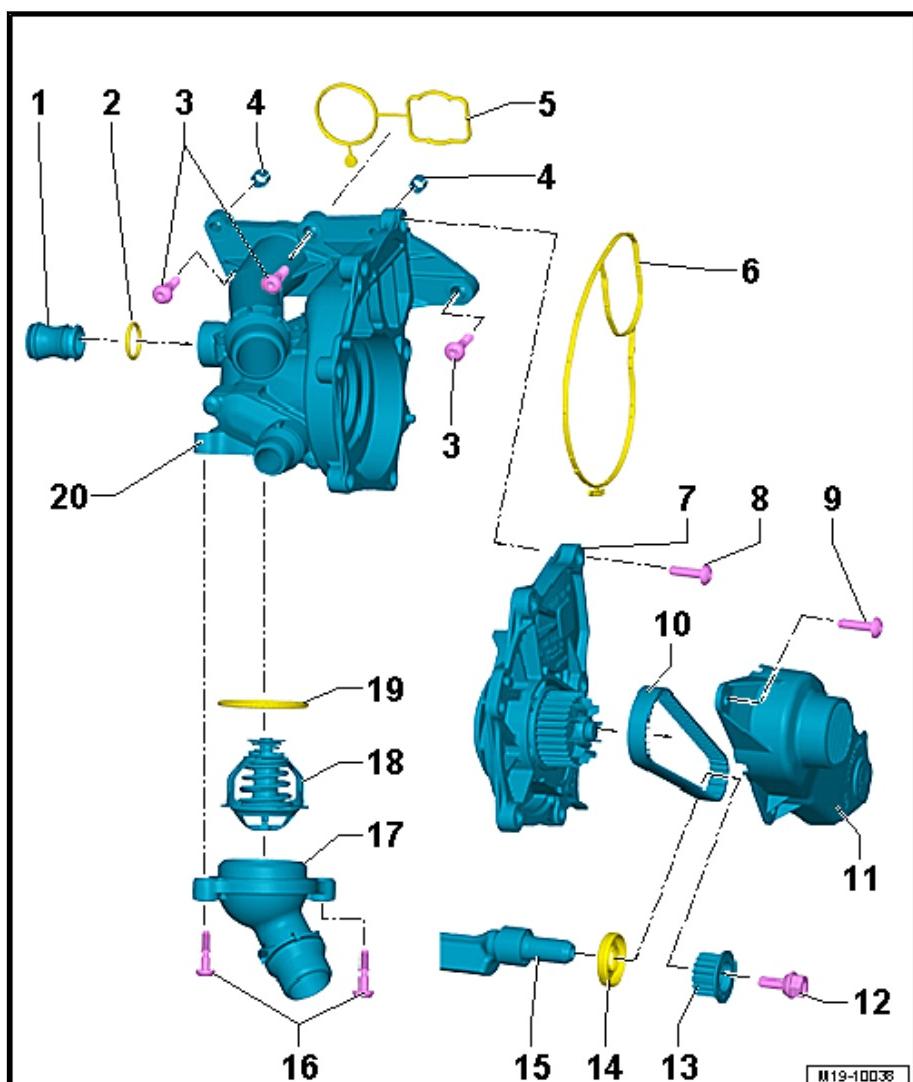
- Note the installation position

14 - Intake Side Balance Shaft Seal

- Refer to [S4.3 haft Sealing Ring, Replacing, Intake Side](#) .

15 - Balance Shaft**16 - Bolt**

- 9 Nm

17 - Connection

M19-10036



18 - Thermostat

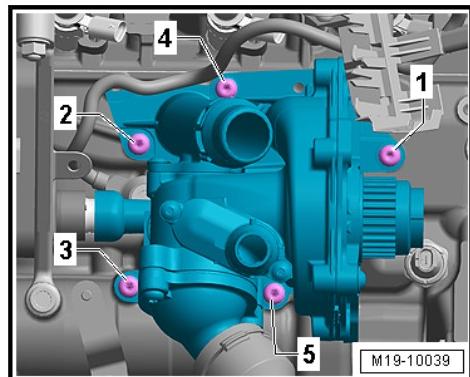
19 - O-ring

- Replace after removing

20 - Coolant Thermostat Housing, Removing and Installing

- Removing and installing. Refer to [T2.7 hermostat Housing, Removing and Installing](#), page 258 .

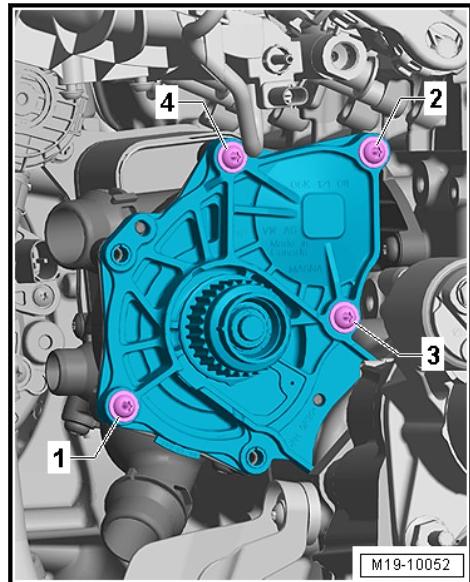
Thermostat - Tightening Specification and Tightening Sequence



- Tighten the bolts in the sequence -1 through 5-.

Tightening Sequence	Tightening Specification
-1 through 5-	9 Nm

Coolant Pump - Tightening Specification and Sequence



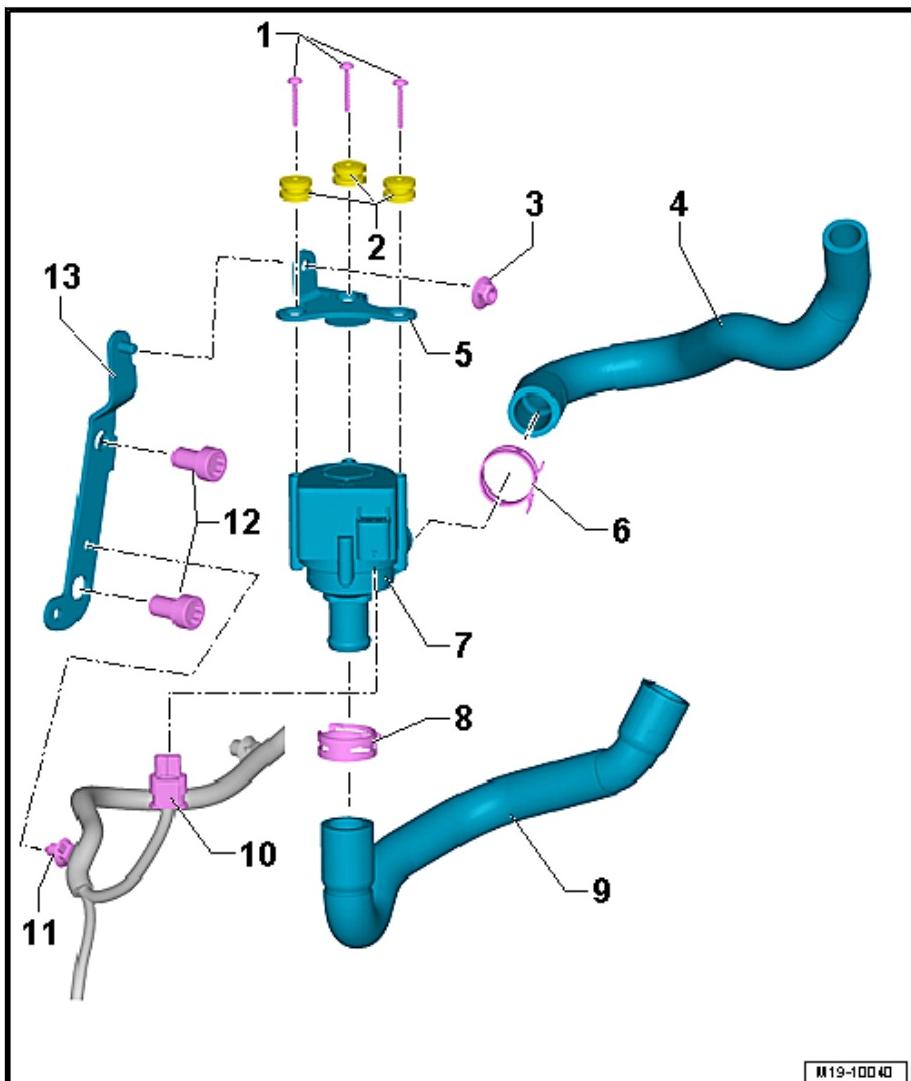
- Tighten the bolts in the sequence -1 through 4-.

Tightening Sequence	Tightening Specification
-1 through 4-	9 Nm

2.2 Overview - Electric Coolant Pump



- 1 - Bolt**
 5 Nm
- 2 - Plastic Sockets**
- 3 - Nut**
 9 Nm
- 4 - Coolant Hose**
- 5 - Bracket**
 For After-Run Coolant Pump -V51-
- 6 - Spring Clamp**
- 7 - After-Run Coolant Pump -V51-**
 With bracket
 Refer to [A2.4 After-Run Coolant Pump V51, Removing and Installing](#), page 252
- 8 - Spring Clamp**
- 9 - Coolant Hose**
- 10 - Connector**
 Clipped on bracket
- 11 - Clip**
- 12 - Bolt**
 20 Nm
- 13 - Bracket**
 After-Run Coolant Pump -V51- to the engine
 Needs to be removed in order to remove the engine
 The lower attachment point is mount for the engine bracket



M19-10040

2.3 Overview - Engine Coolant Temperature Sensor



1 - Clip

- Check that it is secure

2 - O-ring

- Replace after removing

3 - Engine Coolant Temperature Sensor on Radiator Outlet -G83-

- Refer to [E2.9 engine Coolant Temperature Sensor on Radiator Outlet G83, Removing and Installing](#), page 262

4 - Connector

- On the Engine Coolant Temperature Sensor -G62-

5 - Engine Coolant Temperature Sensor -G62-

- Refer to [E2.8 engine Coolant Temperature Sensor G62, Removing and Installing](#), page 261

6 - O-ring

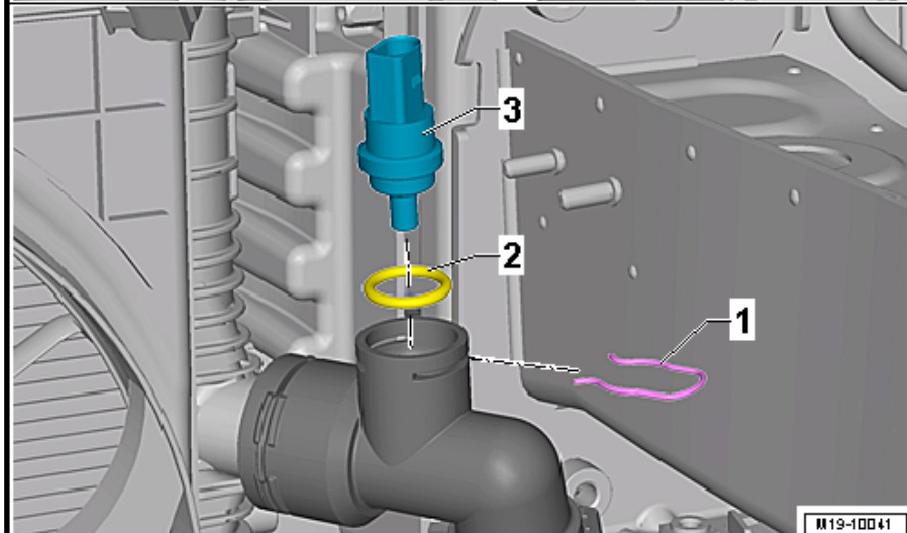
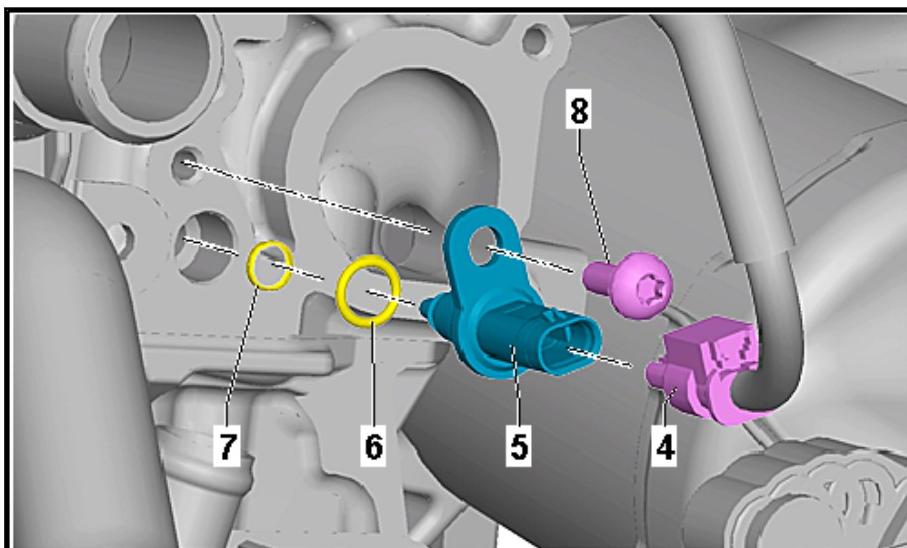
- Replace after removing
- Coat with coolant

7 - O-ring

- Replace after removing
- Coat with coolant

8 - Bolt

- 4 Nm +45°
- Replace after removing



2.4 After-Run Coolant Pump -V51-, Removing and Installing

Special tools and workshop equipment required

- ◆ Hose Clamps - Up To 25 mm -3094-
- ◆ Hose Clip Pliers -VAS6340-
- ◆ Hose Clip Pliers -VAS6362-



Removing



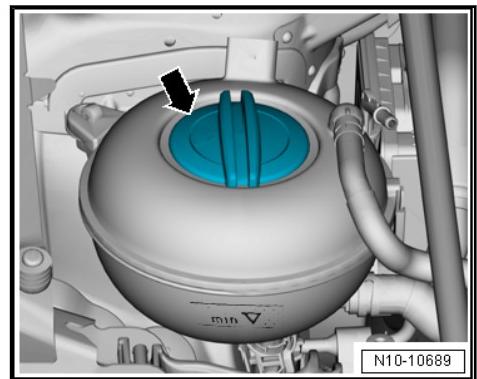
Caution

The cooling system is under pressure when the engine is warm. Risk of scalding due to hot steam and hot coolant.

Scalding the skin and other parts of the body is possible.

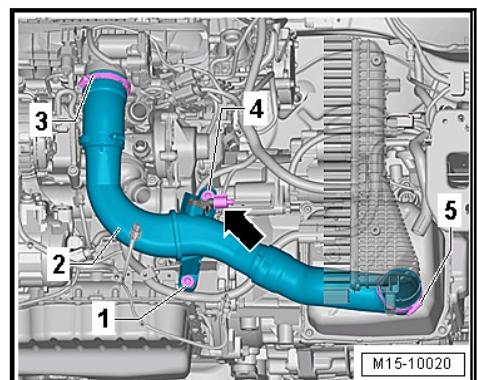
- Wear safety gloves.
- Wear protective eyewear.
- Reduce the pressure by covering the coolant expansion tank cap with a cloth and carefully opening it.

- Remove the coolant expansion tank cap -arrow-.
- Drain the coolant. Refer to [D1.3 Raining and Filling](#), page [239](#).

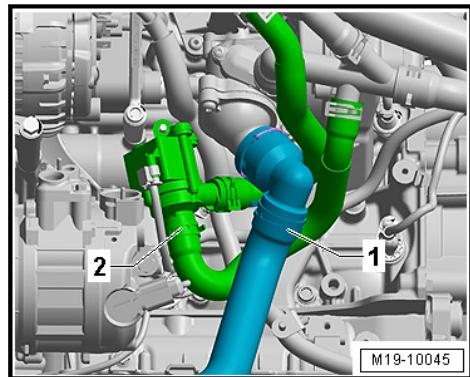


Removing

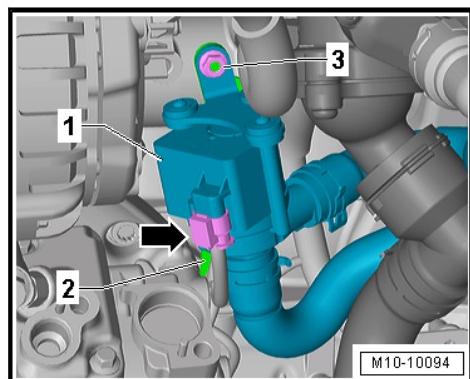
- Remove the engine cover. Refer to [C3.1 over, Removing and Installing](#), page [40](#).
- Remove the air filter housing. Refer to [F3.2 ilter Housing, Removing and Installing](#), page [329](#).
- Loosen the hose clamp -3 and 5-.



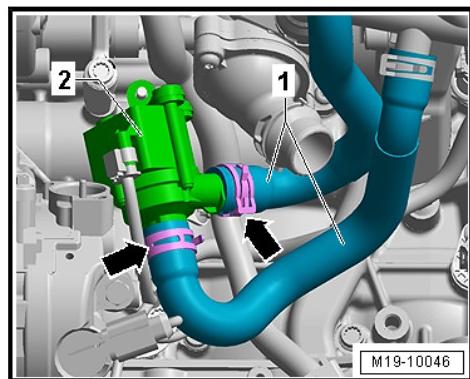
- Disconnect the connector from the Charge Air Pressure Sensor -G31- -arrow-.
- Remove the bolts -1 and 4- and then remove the air duct pipe downward.
- Remove the coolant hose -1- from the thermostat.



- Remove the connector -arrow- from the After-Run Coolant Pump -V51- -1-.
- Remove the nut -3- and remove the After-Run Coolant Pump -V51- -1- from the bracket -2-.



- Clamp off the coolant hoses -1- at the After-Run Coolant Pump -V51- -2- using -3094-.
- Loosen the clamps -arrows- and remove the coolant hoses -1-.



Installing

Install in reverse order of removal and note the following:

- Check the coolant level. Refer to [page 246](#).

Tightening Specifications

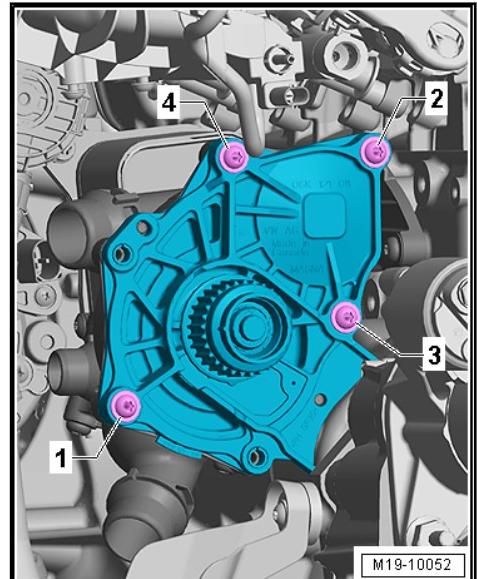
- ◆ Refer to [-2.2 Electric Coolant Pump](#), page 250
- ◆ Refer to [Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation](#).



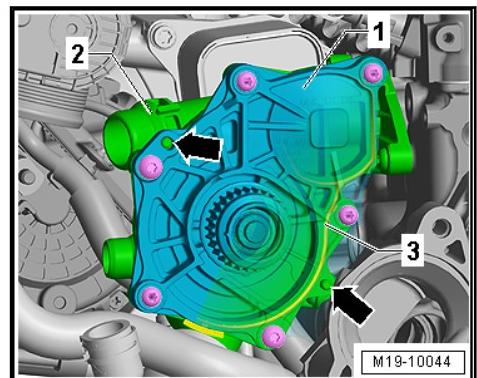
2.5 Coolant Pump, Removing and Installing

Removing

- Remove the coolant pump toothed belt. Refer to [P2.6ump Tothed Belt, Removing and Installing](#), page 256 .
- Remove bolts -1 through 4- and the coolant pump from the thermostat.

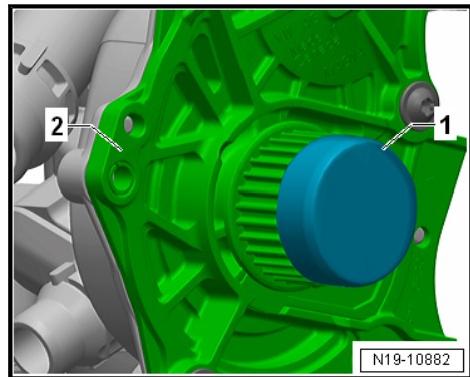


Installing



Install in reverse order of removal and note the following:

- Make sure the pump -1- on the controller housing -2- and the seal -3- are seated properly -arrows-.
- Tighten the coolant pump bolts. Refer to [Fig. "Coolant Pump - Tightening Specification and Sequence"](#), page 250 .
- After installing a new coolant pump -2-, remove the cap -1- from the drive wheel.
- Install the toothed belt on the coolant pump. Refer to [P2.6ump Tothed Belt, Removing and Installing](#), page 256 .
- Fill with coolant. Refer to [page 242](#) .



Tightening Specifications

- ◆ Refer to [⇒ 2.1 Coolant Pump/THERMOSTAT](#), page 248

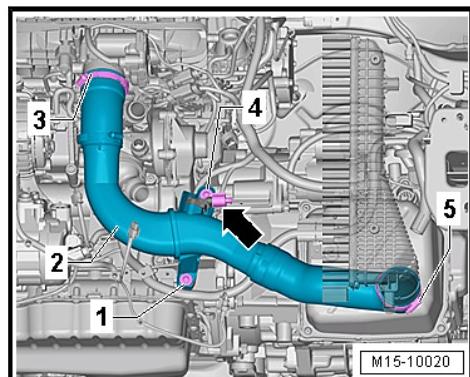
2.6 Coolant Pump Toothed Belt, Removing and Installing

Special tools and workshop equipment required

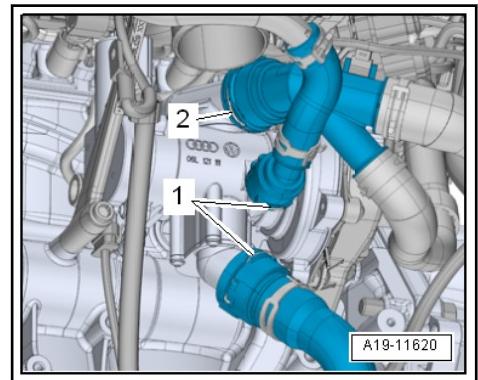
- ◆ Torque Wrench 1331 Insert - Ring Wrench - 12mm -T10360-
- ◆ Counterhold - Vibration Damper -T10355-

Removing

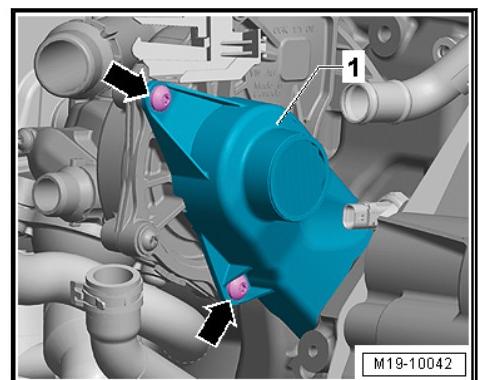
- Drain the coolant. Refer to [⇒ D1.3 Raining and Filling](#), page 239 .
- Remove the right front wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing.
- Remove the air filter housing. Refer to [⇒ F3.2 Filter Housing, Removing and Installing](#), page 329 .
- Loosen the hose clamps -3 and 5-.
- Disconnect the connector from the Charge Air Pressure Sensor -G31- -arrow-.
- Remove the bolts -1 and 4- and then remove the air duct pipe downward.



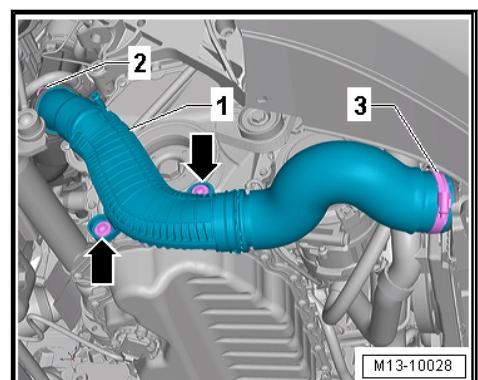
- Lift the clamp -2-, remove the coolant supports and set them aside.



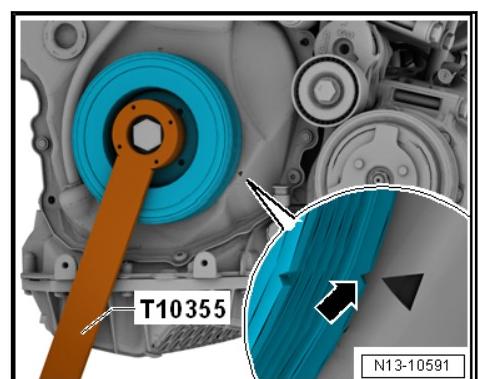
- Remove the bolts -arrows- and remove the toothed belt guard -1-.



- Remove the bolts -arrows-.



- Remove the air duct pipe by lifting the clip -2- and opening the screw-type clamp -3-.
- Counterhold the vibration damper with the -T10355-.

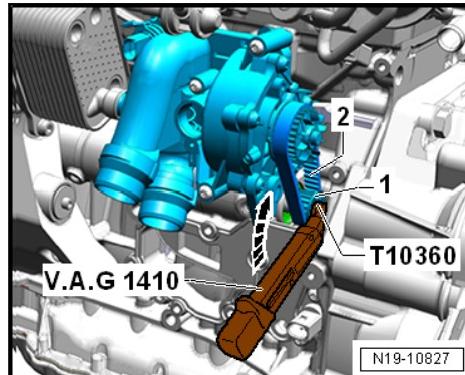




Note

The drive gear bolt has a left thread.

- Counterhold the vibration damper and remove the bolt from the coolant pump the drive wheel -1- by loosening three turns. Use -VAG1410- and -T10360-.
- Remove the toothed belt -2-.



Installing

Install in reverse order of removal and note the following:

Note

- ◆ Replace the bolt for the coolant pump drive wheel.
- ◆ Note the toothed belt sprocket installation location -item 13-
⇒ Item 13 (page 249).
- Fill with coolant. Refer to [⇒ page 242](#).

Tightening Specifications

- ◆ Refer to [⇒ -2.1 Coolant Pump/Thermostat](#), page 248 .
- ◆ Refer to [⇒ F3.2 Filter Housing, Removing and Installing](#),
[page 329](#)

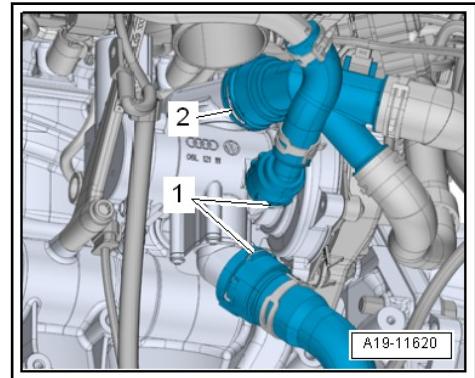
2.7 Coolant Thermostat Housing, Removing and Installing

Special tools and workshop equipment required

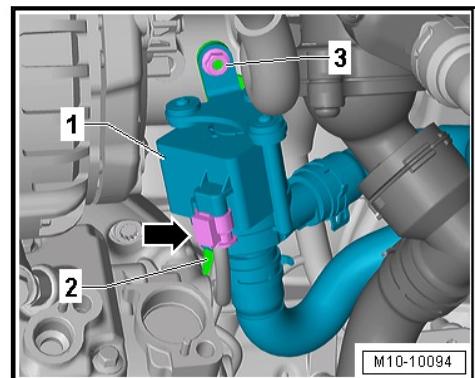
- ◆ Hose Clamps - Up To 25 mm -3094-
- ◆ Hose Clip Pliers -VAS6362-

Removing

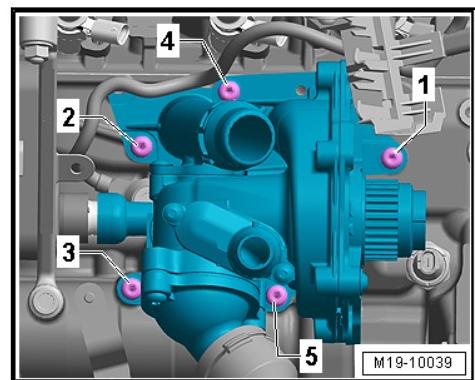
- Remove the intake manifold. Refer to [⇒ M4.2 Manifold, Removing and Installing](#), page 333 .
- Remove the coolant pump. Refer to [⇒ P2.5 Pump, Removing and Installing](#), page 255 .
- Lift the clamps -1 and 2- and remove the coolant hoses.



- Remove the connector -arrow- from the After-Run Coolant Pump -V51- -1-.



- Remove the nut -3- and remove the After-Run Coolant Pump -V51- -1- from the bracket -2-.
- Push the generator wire to the side. Remove the bolt -3- from the coolant thermostat housing.



- Remove the remaining bolts -1- through -5-.
- Remove the coolant thermostat housing from the centering pins and remove the engine oil cooler.

Installing

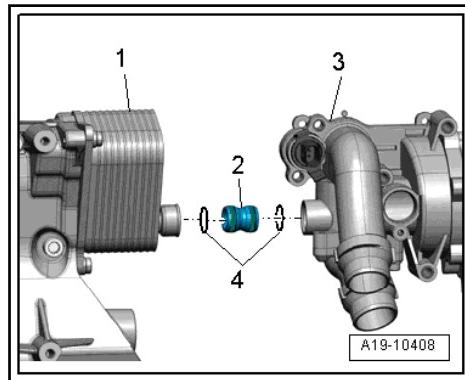
Install in reverse order of removal and note the following:

- Replace the seals and O-rings.
- Coat the O-rings -4- with coolant. Refer to Parts Catalog for the coolant.

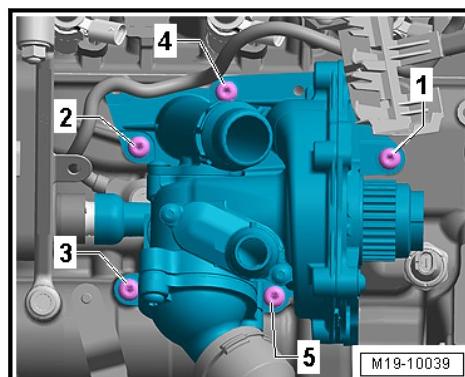


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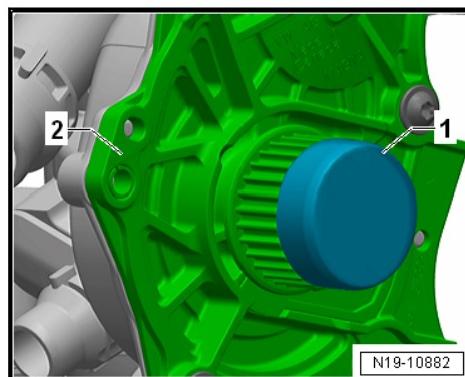
4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021



- Make sure that both centering pins are installed in the cylinder block if necessary insert.
- Install the connection piece -2- into the engine oil cooler -1-.
- Push the coolant thermostat housing -3- onto the connection piece and onto the centering pins in the cylinder block.
- Tighten the coolant thermostat housing bolts. Refer to [Fig. "Thermostat - Tightening Specification and Tightening Sequence"](#), page 250 .



- Install the coolant pump. Refer to [P2.5 ump, Removing and Installing](#), page 255 .
- After installing a new coolant pump -2-, remove the cap -1- from the drive wheel.



- Install the coolant pump toothed belt. Refer to [P2.6 ump Toothed Belt, Removing and Installing](#), page 256 .
- Secure the After-Run Coolant Pump -V51- again.
- Install the intake manifold. Refer to [M4.2 anifold, Removing and Installing](#), page 333 .
- Fill the coolant. Refer to [page 242](#) .



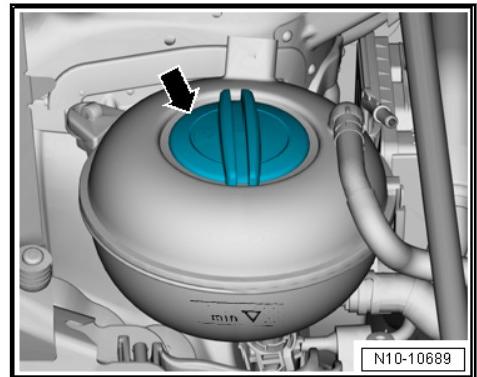
Tightening Specifications

- ◆ Refer to [⇒ -2.1 Coolant Pump/THERMOSTAT](#), page 248 .
- ◆ Refer to [⇒ -4.1 INTAKE MANIFOLD](#), page 331

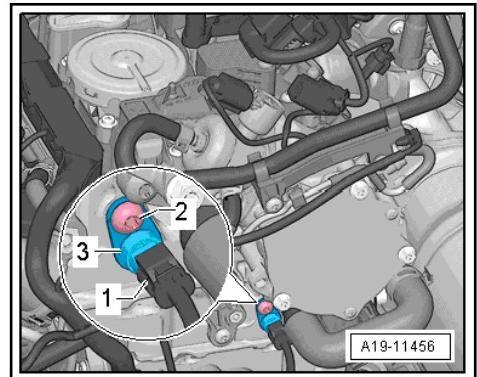
2.8 Engine Coolant Temperature Sensor - G62-, Removing and Installing

Removing

- The engine is cold.
- Quickly open the coolant expansion tank cap -arrow- and release any remaining pressure in the cooling system and then close it again until it locks.



- Remove the air filter housing. Refer to [⇒ F3.2 AIR FILTER HOUSING, REMOVING AND INSTALLING](#), page 329 .
- Disconnect the connector -1-.



Note

- ◆ Place a cloth underneath to catch any escaping coolant.
- ◆ To prevent coolant loss, immediately insert the new Engine Coolant Temperature Sensor -G62- in the connection.
- Remove the bolts -2-, and remove the Engine Coolant Temperature Sensor -G62- -3-.

Installing

Install in reverse order of removal and note the following:



Note

Replace the O-rings.

- Check the coolant level. Refer to [⇒ page 246](#).

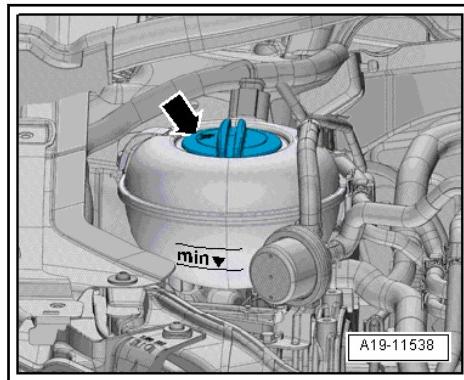
Tightening Specifications

- ♦ Refer to [⇒ -2.3 Engine Coolant Temperature Sensor](#), page [251](#)

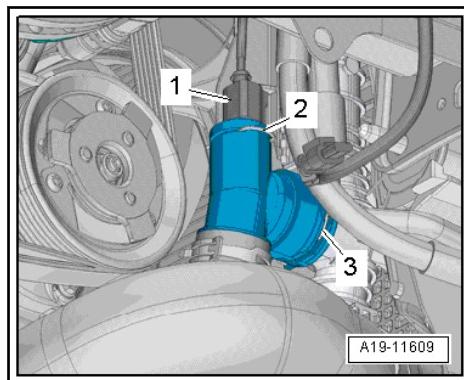
2.9 Engine Coolant Temperature Sensor on Radiator Outlet -G83-, Removing and Installing

Removing

- The engine is cold.
- Quickly open the coolant expansion tank cap -arrow- and release any remaining pressure in the cooling system and then close it again until it locks.



- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Disconnect the connector -1-.



- Remove clamp -2- and Engine Coolant Temperature Sensor on Radiator Outlet -G83- -3-.

Installing

Install in reverse order of removal and note the following:

**Note**

Replace the O-ring.

- Check the coolant level. Refer to [⇒ page 246](#).

Tightening Specifications

- ◆ Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.



3 Coolant Pipes

- ⇒ [-3.1 Coolant Pipes", page 264](#)
- ⇒ [P3.2 pipes, Removing and Installing", page 264](#)
- ⇒ [C3.3 oolant Pipes, Removing and Installing", page 265](#)

3.1 Overview - Coolant Pipes

1 - Front Coolant Pipe

- Removing and installing. Refer to ⇒ [P3.2 pipes, Removing and Installing", page 264](#).

2 - Bolts

- 6 Nm

3 - Upper Coolant Pipe

- Removing and installing. Refer to ⇒ [C3.3 oolant Pipes, Removing and Installing", page 265](#).

4 - Bolts

- 9 Nm

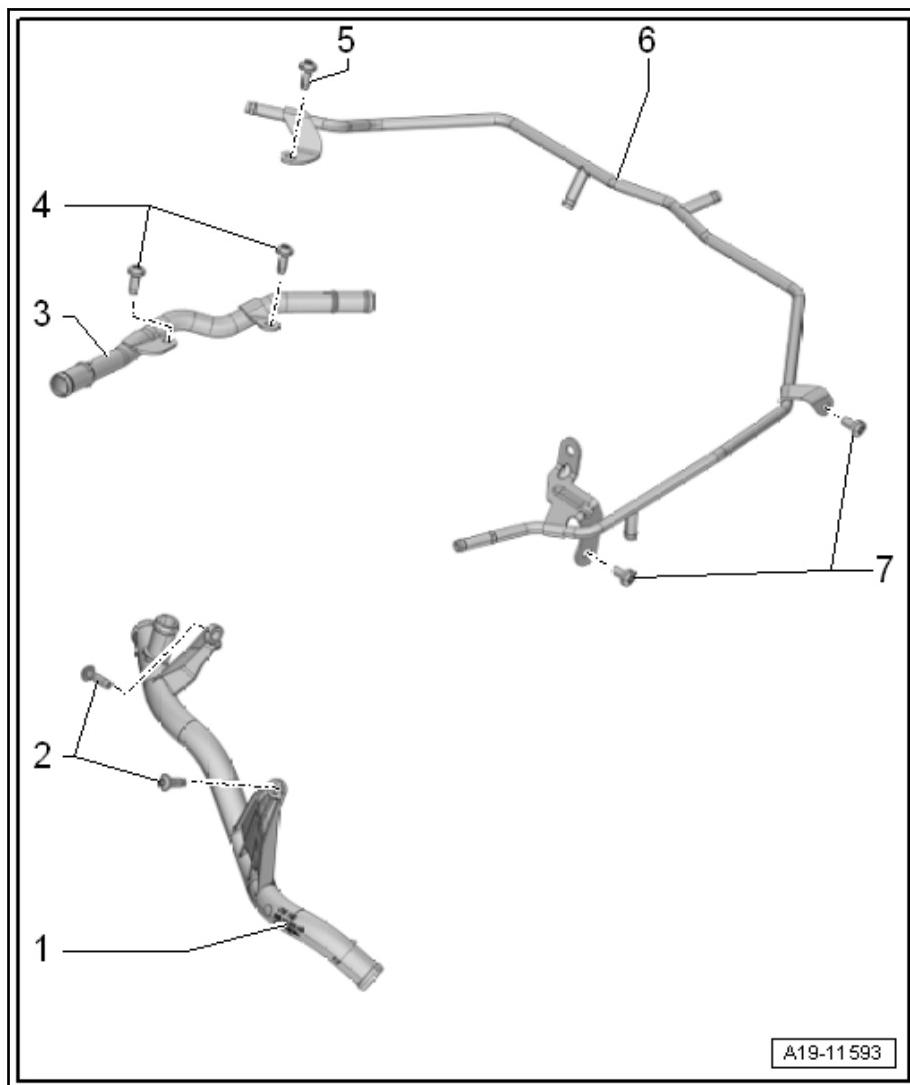
5 - Bolt

- 9 Nm

6 - Coolant Line

7 - Bolts

- 9 Nm



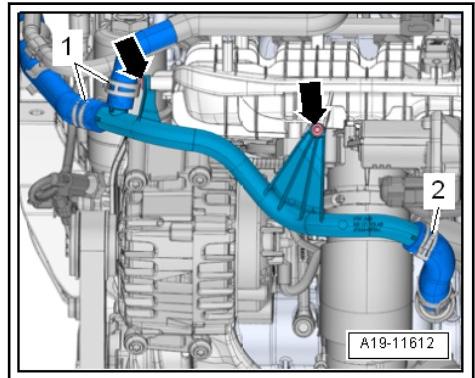
3.2 Coolant Pipes, Removing and Installing

Special tools and workshop equipment required

- ◆ Hose Clamps - Up To 25 mm -3094-
- ◆ Hose Clip Pliers -VAS6362-

Removing

- Remove the air filter housing. Refer to ⇒ [F3.2 ilter Housing, Removing and Installing", page 329](#).
- Disconnect the coolant hoses -1 and 2- with -3094-.



- Loosen the clamps and remove the coolant hoses.
- Remove the bolts -arrows- and the front coolant pipe.

Installing

Install in reverse order of removal and note the following:



Note

Secure all hose connections with hose clamps that match the ones used in series production. Refer to the Parts Catalog.

- Check the coolant level. Refer to [⇒ page 246](#).

Tightening Specifications

- ◆ Refer to [⇒ -3.1 Coolant Pipes](#), page 264

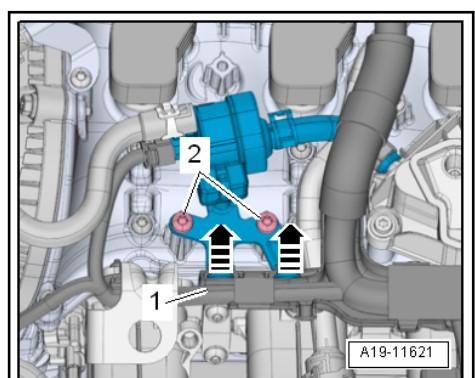
3.3 Upper Coolant Pipes, Removing and Installing

Special tools and workshop equipment required

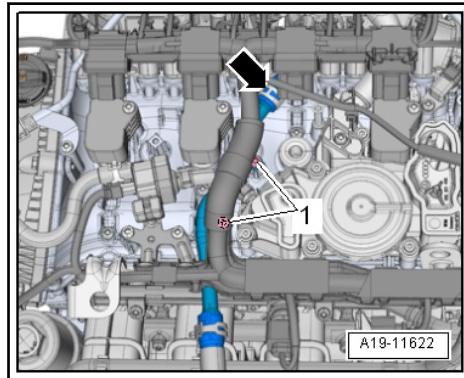
- ◆ Hose Clamps - Up To 25 mm -3094-
- ◆ Hose Clip Pliers -VAS6362-

Removing

- Remove the cylinder ignition coil “3”. Refer to [⇒ C1.3 oils with Power Output Stages, Removing and Installing](#), page 386 .
- Release retainers in direction of -arrows- and remove wiring duct -1- from bracket.



- Clamp off the coolant hoses -arrows- with the -3094-.



- Loosen the clamps and remove the coolant hoses.
- Remove the bolt -1- and remove the upper coolant pipe.

Installing

Install in reverse order of removal and note the following:



Note

Secure all hose connections with hose clamps that match the ones used in series production. Refer to the Parts Catalog.

- Check the coolant level. Refer to [page 246](#).

Tightening Specifications

- ◆ Refer to [-3.1 Coolant Pipes](#), page 264



4 Radiator/Radiator Fan

- [**⇒ 4.1 Radiator/Radiator Fan", page 267**](#)
- [**⇒ 4.2 Fan Shroud and Radiator Fan", page 268**](#)
- [**⇒ 4.3 Radiator Shutter", page 269**](#)
- [**⇒ R4.4 emoving and Installing", page 272**](#)
- [**⇒ S4.5 hroud, Removing and Installing", page 273**](#)
- [**⇒ F4.6 an, Removing and Installing", page 274**](#)
- [**⇒ C4.7 ooler, Removing and Installing", page 274**](#)
- [**⇒ S4.8 hutter, Removing and Installing", page 275**](#)
- [**⇒ R4.9 adiator Shutter MotorV544, Removing and Installing", page 277**](#)

4.1 Overview - Radiator/Radiator Fan

**1 - Side Air Duct**

- Left
- Removing and installing. Refer to [⇒ Body Exterior; Rep. Gr. 50; Lock Carrier; Lock Carrier, Removing and Installing.](#)

2 - Lock Carrier

- Removing and installing. Refer to [⇒ Body Exterior; Rep. Gr. 50; Lock Carrier; Lock Carrier, Removing and Installing.](#)

3 - Condenser

- Removing and installing. Refer to [⇒ Rep. Gr. 87; Refrigerant Circuit; Condenser, Removing and Installing.](#)

4 - Bolts

- 8 Nm

5 - Side Air Duct

- Right
- Removing and installing. Refer to [⇒ Body Exterior; Rep. Gr. 50; Lock Carrier; Lock Carrier, Removing and Installing.](#)

6 - Seal

- Replace if damaged

7 - Bolts

- 8 Nm

8 - Radiator

- Change the coolant after replacing
- Removing and installing. Refer to [⇒ R4.4 removing and Installing", page 272](#).

9 - Bolts

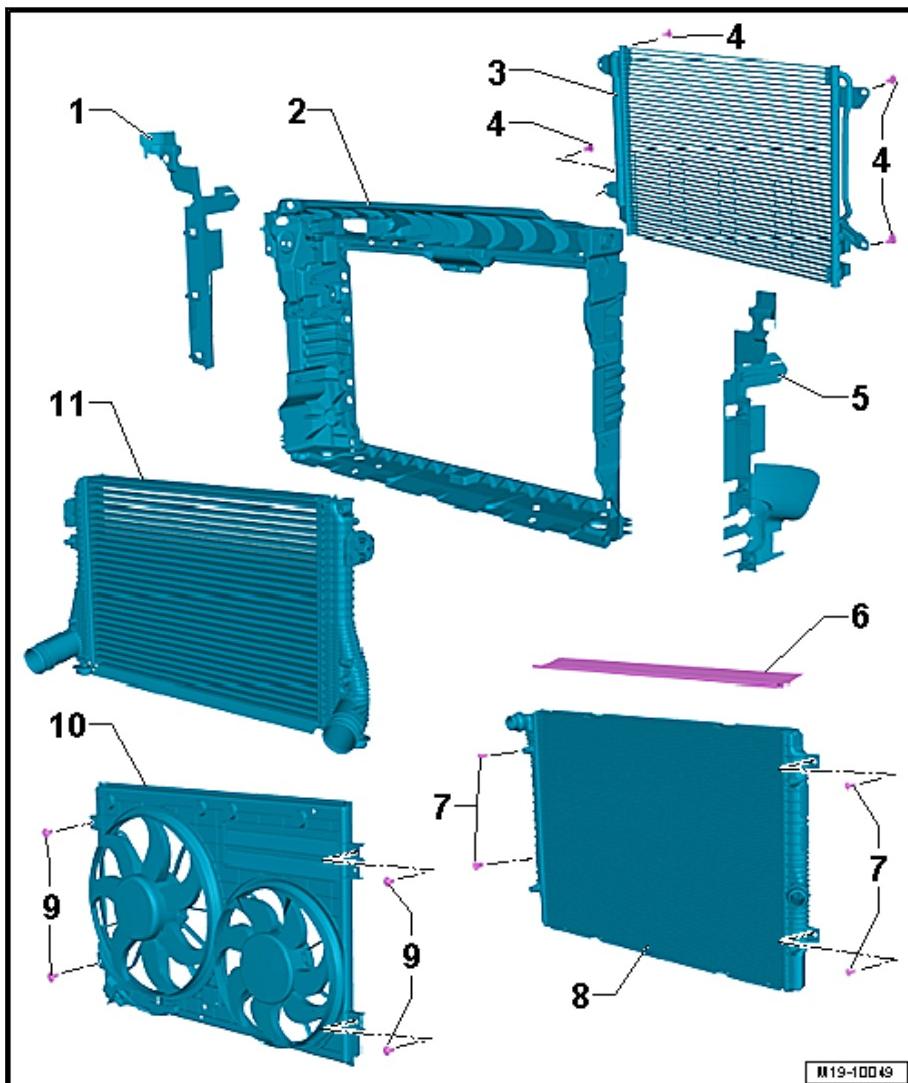
- 8 Nm

10 - Fan Shroud

- Removing and installing. Refer to [⇒ S4.5 hroud, Removing and Installing", page 273](#).

11 - Charge Air Cooler

- Removing and installing. Refer to [⇒ R4.4 removing and Installing", page 272](#).



4.2 Overview - Fan Shroud and Radiator Fan

**1 - Fan Shroud**

- Removing and installing. Refer to [S4.5 hroud, Removing and Installing", page 273 .](#)

2 - Bolt

- 5 Nm
- Fan shroud to radiator

3 - Bolt

- Fan shroud to radiator
- Tightening specification. Refer to [-4.1 Radiator/Radiator Fan", page 267 .](#)

4 - Radiator Fan 2 -V177-

- Removing and installing. Refer to [F4.6 an, Removing and Installing", page 274 .](#)

5 - Radiator Fan -V7-

- Removing and installing. Refer to [F4.6 an, Removing and Installing", page 274 .](#)

6 - Bracket

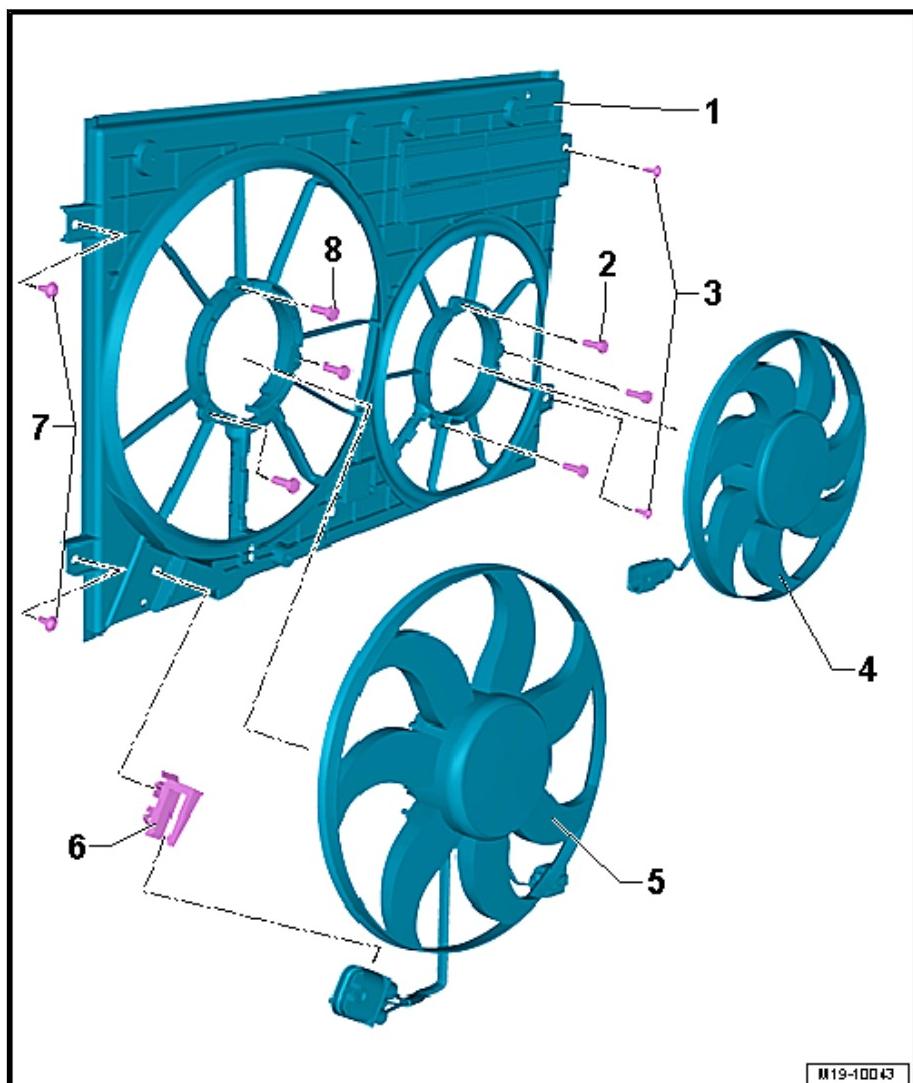
- Coupling point

7 - Bolt

- Fan shroud to radiator
- Tightening specification -item 9- [Item 9 \(page 268\) .](#)

8 - Bolt

- 5 Nm

**4.3 Overview - Radiator Shutter**

[⇒ 4.3.1 Radiator Shutter", page 269](#)

[⇒ 4.3.2 Radiator Shutter Components", page 271](#)

4.3.1 Overview - Radiator Shutter



1 - Impact Member

- Overview. Refer to → Body Exterior; Rep. Gr. 63; Front Bumper; Overview - Front Bumper Cover.

2 - Rear Seal

3 - Radiator Shutter Motor - V544-

- Removing and Installing. Refer to → [R4.9 Radiator Shutter Motor V544, Removing and Installing](#), page 277 .

4 - Retaining Tabs

- For the seals

5 - Outside Air Temperature Sensor -G17-

- Component location. Refer to -item 12- → [Item 12 \(page 270\)](#) .
- clipped in on the front seal
- Wiring diagrams, Troubleshooting & Component locations

6 - Radiator Shutter

- Removing and installing

7 - Connector Terminal

- For the Radiator Shutter Motor -V544-
- Attached to the lock carrier
- Wiring diagrams, Troubleshooting & Component locations

8 - Bracket

- For the lock carrier connector terminal -item 7- → [Item 7 \(page 270\)](#)

9 - Bolt

- 8 Nm
- Quantity: 2

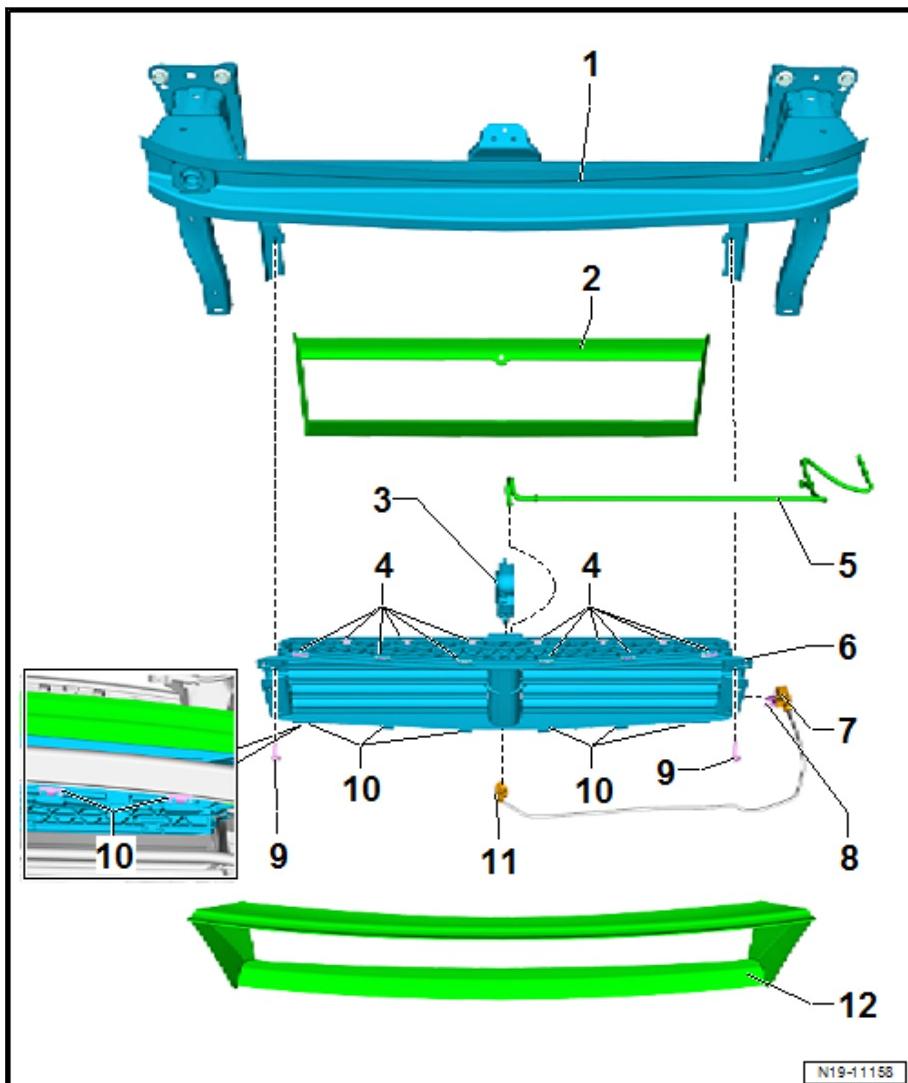
10 - Wiring Harness

- For the Radiator Shutter Motor -V544-
- Wiring diagrams, Troubleshooting & Component locations

11 - Retaining Tabs

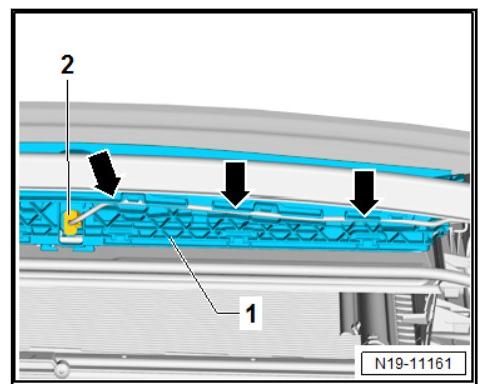
- For the seals

12 - Front Seal





Wire Routing on the Radiator Shutter



- The wiring harness -2- for the Radiator Shutter Motor - V544- is clipped in the frame from the radiator shutter -1- -arrows-.

4.3.2 Overview - Radiator Shutter Components

1 - Bracket

2 - Bolt

1.5 Nm

3 - Radiator Shutter Motor - V544-

Removing and Installing. Refer to [R4.9 Radiator Shutter Motor V544, Removing and Installing](#), page 277 .

4 - Shutters

Pay attention to the layout. Refer to [Fig. "Layout of the slats"](#), page 271 .

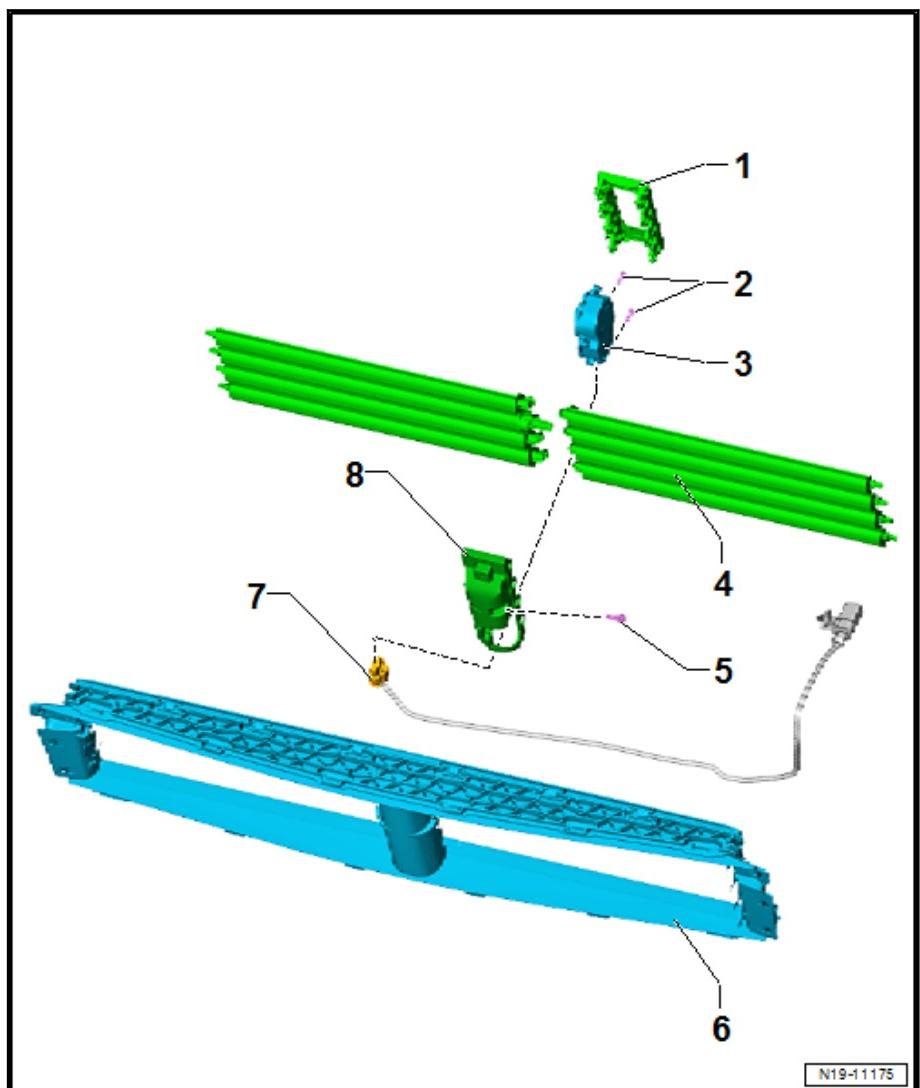
5 - Bolt

1.5 Nm

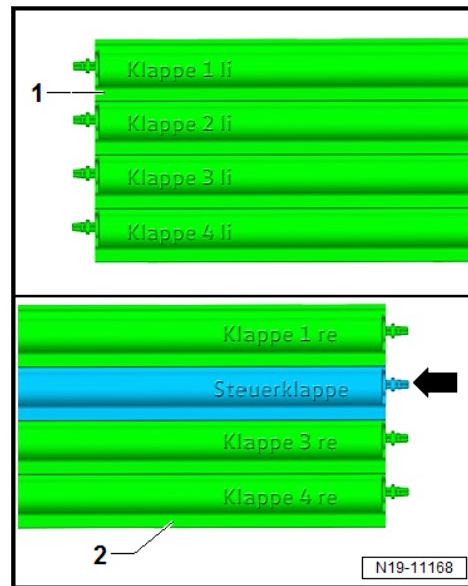
6 - Frame

7 - Wiring Harness

8 - Engine Mount



Layout of the slats



1 -- Left doors

2 -- Right doors

Arrow -- Control door

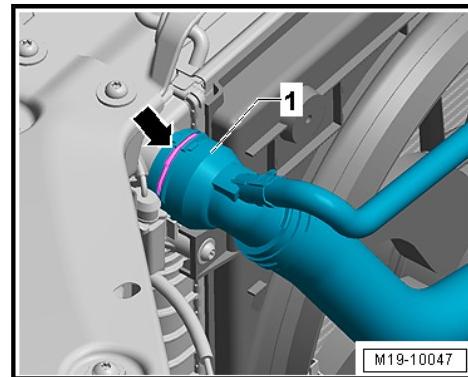
4.4 Radiator, Removing and Installing

Special tools and workshop equipment required

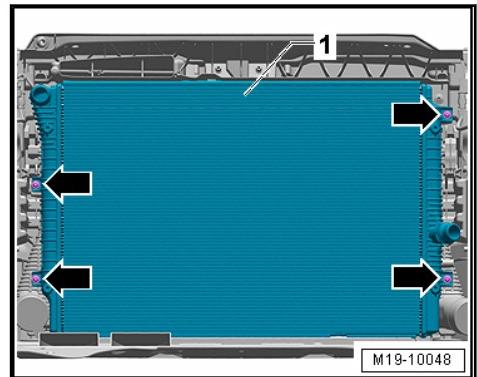
- ♦ Hose Clamps - Up To 25 mm -3094-

Removing

- Drain the coolant. Refer to [D1.3 raining and Filling](#), page [239](#).
- Remove the fan shroud. Refer to [S4.5 hroud, Removing and Installing](#), page [273](#).
- Open the clip -arrow-.



- Remove the upper radiator coolant hose -1-.
- Remove the radiator bolts -arrows- and then remove the radiator -1- upwards.



Installing

Install in reverse order of removal. Note the following:

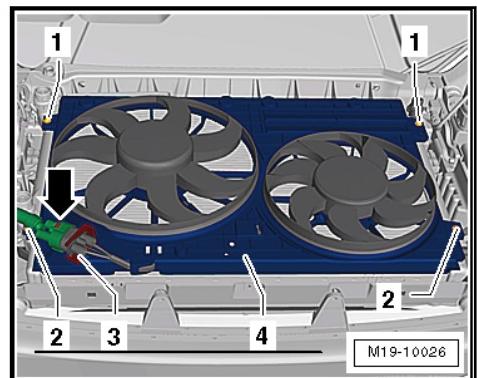
- Install the fan shroud. Refer to [⇒ S4.5 hroud, Removing and Installing](#), page 273 .
- Fill with new coolant. Refer to [⇒ page 246](#) .

Tightening Specifications

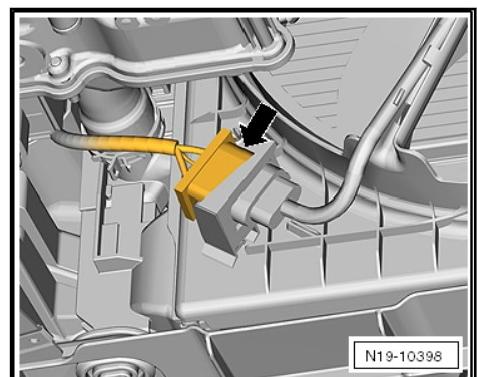
- ◆ Refer to [⇒ -4.1 Radiator/Radiator Fan](#), page 267

4.5 Fan Shroud, Removing and Installing

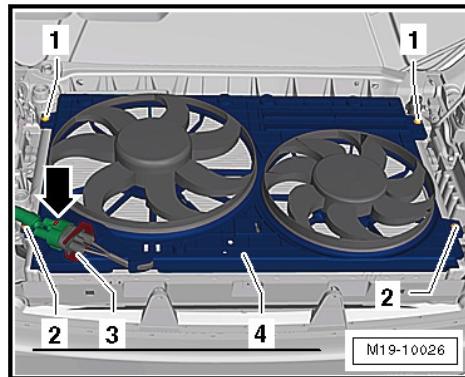
- Remove the bolts at the top of the fan shroud -1-.



- Remove the noise insulation. Refer to [⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation](#).
- Release and disconnect the connector -arrow-.



- Remove the bolts at the bottom of the fan shroud -2-.
- Remove the air shroud downward.



Installing

Install in reverse order of removal. Note the following:

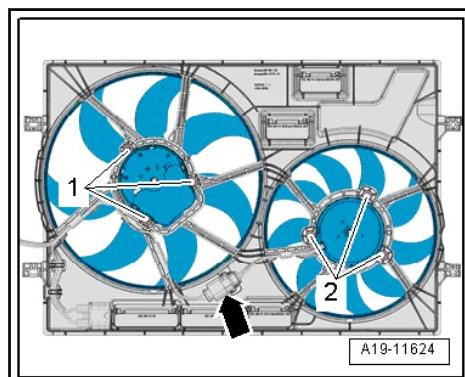
Tightening Specifications

- ◆ Refer to [-4.1 Radiator/Radiator Fan", page 267](#)

4.6 Radiator Fan, Removing and Installing

Removing

- Remove the fan shroud. Refer to [S4.5 hroud, Removing and Installing", page 273](#).
- Disconnect the connector -arrow-.



- Remove the bolts -1-, and remove the Radiator Fan -V7-.
- Remove the bolts -2-, and remove the Radiator Fan 2 - V177-.

Installing

Install in reverse order of removal and note the following:

- Install the fan shroud. Refer to [S4.5 hroud, Removing and Installing", page 273](#).

Tightening Specifications

- ◆ Refer to [-4.2 Fan Shroud and Radiator Fan", page 268](#)

4.7 Auxiliary Cooler, Removing and Installing

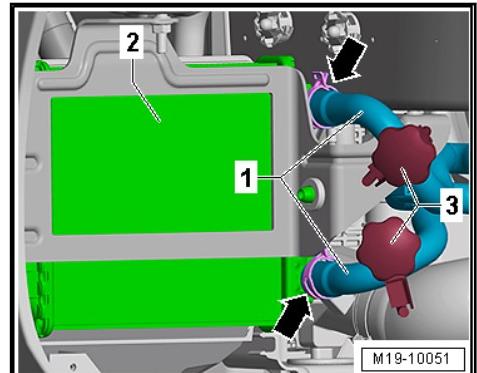
Special tools and workshop equipment required

- ◆ Hose Clamps - Up To 25 mm -3094-
- ◆ Hose Clip Pliers -VAS6362-

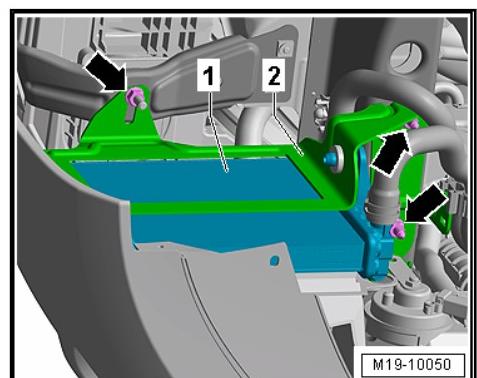


Removing

- Remove the left front wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing.
- Clamp off both coolant hoses -1- with -VAS6362- -3-.



- Open the spring-type clamps -arrows- to remove both coolant hoses -1- from the auxiliary cooler -2-.
- Remove nuts -arrows- and auxiliary cooler -1- with bracket -2-.



Note

Disengage the air duct from the radiator when removing the auxiliary cooler.

Installing

Install in reverse order of removal and note the following:

- Check the coolant level and fill up if necessary. Refer to ⇒ [page 246](#).

Tightening Specifications

Nuts	Tightening Specification
-arrows-	25 Nm

4.8 Radiator Shutter, Removing and Installing

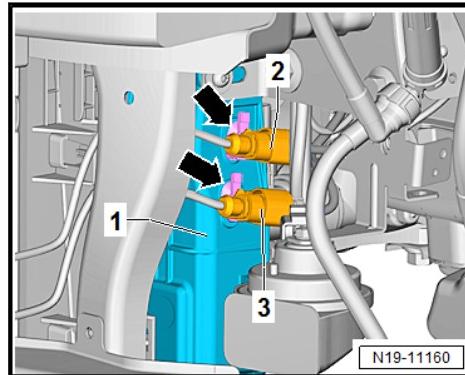
Special tools and workshop equipment required

- ◆ Pry Lever -80-200-
- ◆ Trim Removal Wedge -3409-

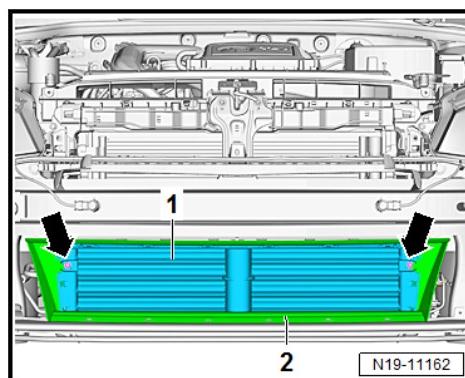


Removing

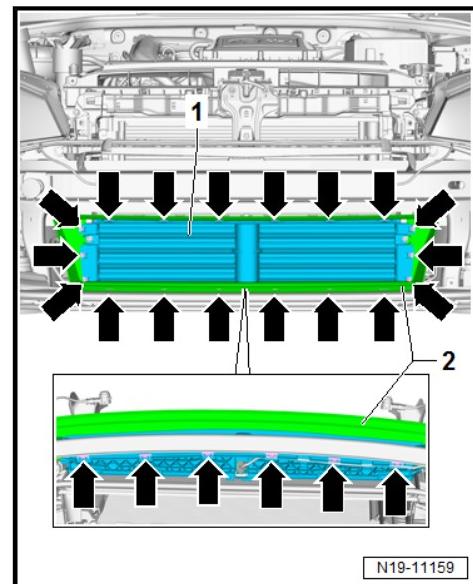
- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Noise Insulation, Removing and Installing
- Remove the front bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63; Front Bumper; Bumper Cover, Removing and Installing
- Disconnect and remove the connectors -2 and 3-



- Unclip the bracket -arrows- on the front end -1-
- Remove the bolts -arrows-



- Pull the radiator shutter -1- forward with the seal -2-.
- Secure the radiator shutter -1- from falling out.
- Unclip the seal -2- on the tabs -arrows-.

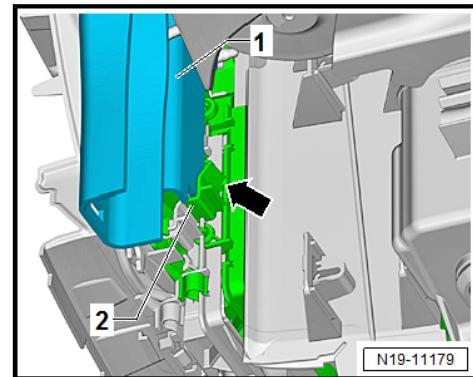


- Remove the seal -2- from the radiator shutter -1-.
- Remove the radiator shutter -1- downward.

Installing

Install in reverse order of removal. Note the following:

- Make sure the guides for the radiator shutter -2- sit correctly on the impact member -1- -arrow-.



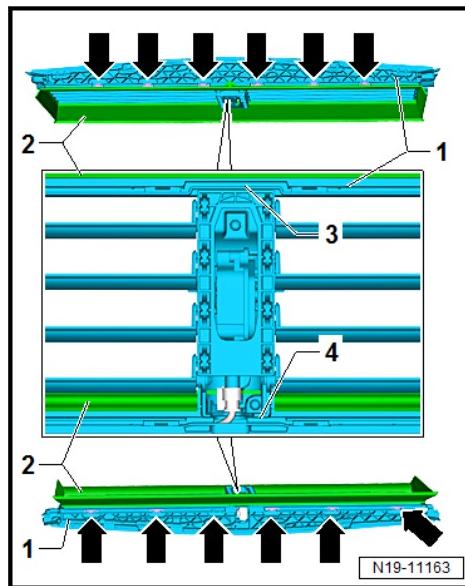
- The radiator shutter must be adapted if it is replaced.
- Adapt the Radiator Shutter Motor -V544- using the Vehicle Diagnostic Tester:
 - ◆ [0001 - basic setting]
 - ◆ [0001 - Adaptation of the Radiator Shutter Motor - V544]

Tightening Specifications

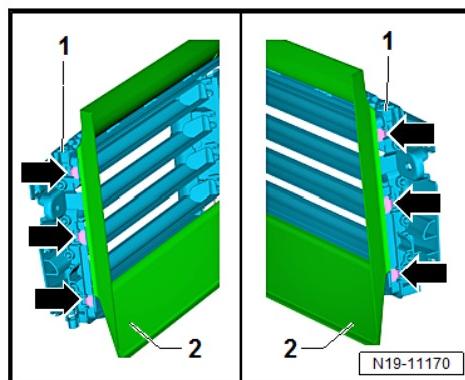
- ◆ Refer to [⇒ -4.3 Radiator Shutter](#), page 269

4.9 Radiator Shutter Motor -V544-, Removing and Installing

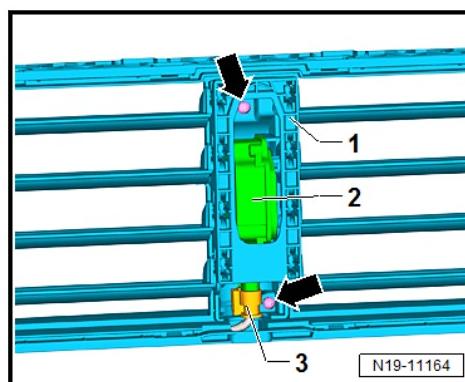
- Remove the radiator shutter.
- Unclip the seal -2- from the upper and lower tabs -arrows-.



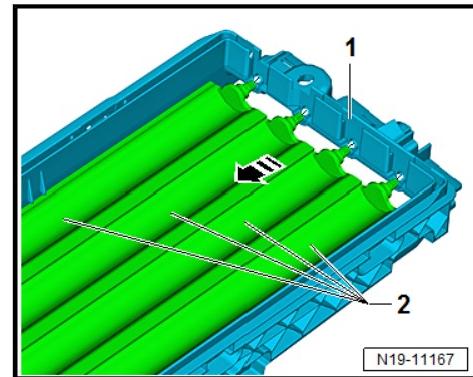
- Remove the seal -2- from the radiator shutter -1-.
- Unclip the seal -2- from the right and left tabs -arrows-.



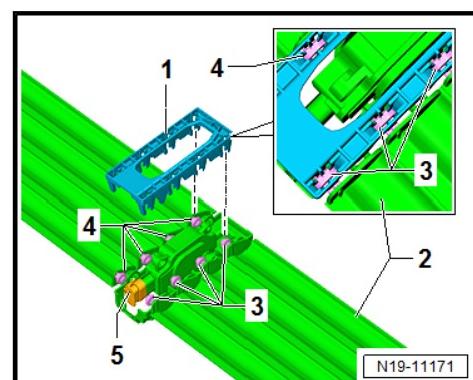
- Remove the seal -2- from the radiator shutter -1-.
- Position the radiator shutter door as shown to open.



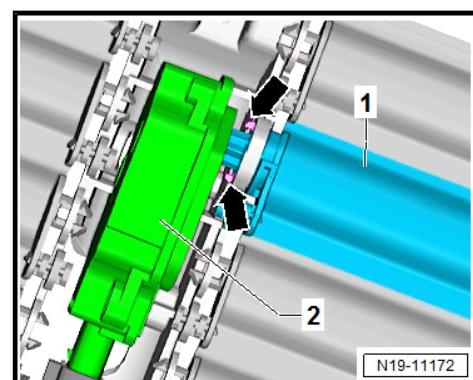
- Move the connecting bridge -1- to do so.
- Release the connector -3- and remove.
- Remove the bolts -arrows-.
- Lift the Radiator Shutter Motor -V544- together with the doors upward from the engine mount.
- Push the Radiator Shutter Motor -V544- with the doors -2- as far as possible to the left in direction of -arrow-.



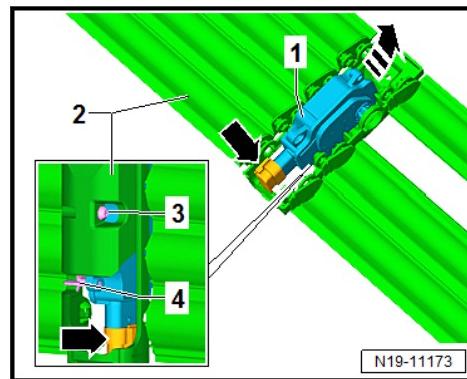
- Lift the doors -2- for the right side from the frame -1-.
- Mark the installation position of the connecting bridge -1-.



- Use the connector terminal -5- as a reference point.
- Lift the connecting bridge -1- from the guide rollers -3- and -4- of the doors -2-.
- Remove the control door -1- from the Radiator Shutter Motor -V544- -2-.



- To do so release the tabs -arrows-.
- Remove the bolt -3-, if equipped.

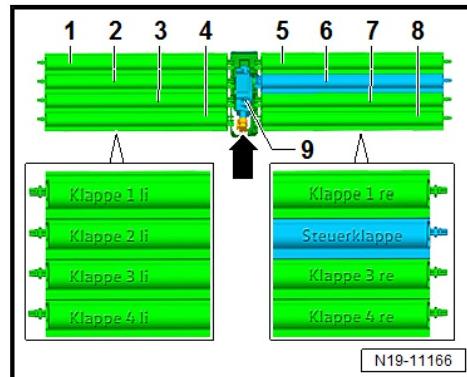


- Pivot the Radiator Shutter Motor -V544- upward in the direction of -arrow-.
- Remove the Radiator Shutter Motor -V544- from the pin -4-.
- If necessary, release the doors from the engine mount and remove.

Installing

Install in reverse order of removal. Note the following:

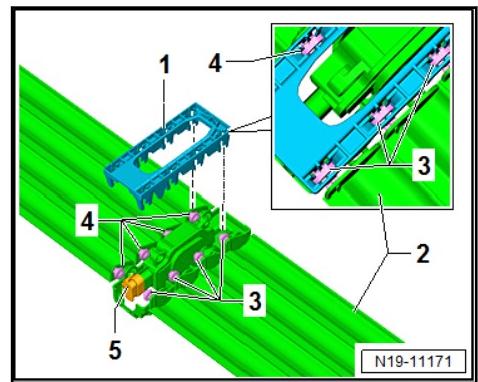
- Insert and engage the doors -1 to 8- as shown.



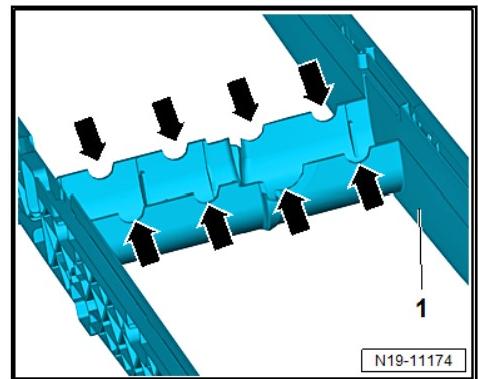
- Push in the control door -6- and engage.
- When installing pay attention to the position of the connector terminal -arrow-. The connector terminal points downward.
- Pay attention to the layout of the doors. The doors rest on top of each other.
- The upper doors rest on the doors underneath.

Num- ber	Left Doors	Num- ber	Right Doors
1	Left door 1	5	Right door 1
2	Left door 2	6	Control door
3	Left door 3	7	Right door 3
4	Left door 4	8	Right door 4

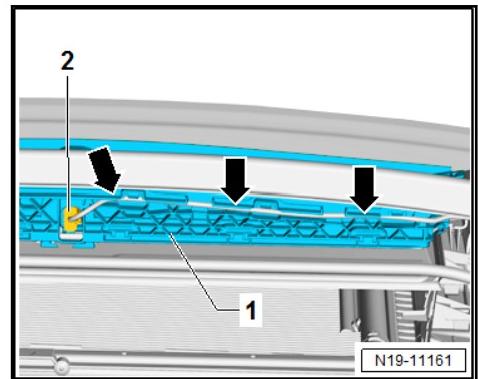
- Position the connecting bridge -1- in the correct installation position.



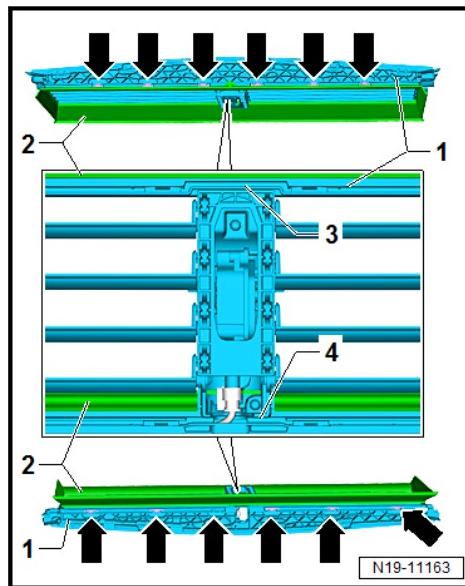
- To do so use the applied mark or the connector terminal -arrow- as a reference point.
- Pay attention that the connecting bridge is seated correctly on the guide rollers when engaging.
- Insert the door with the Radiator Shutter Motor -V544- in the frame.
- Tighten the Radiator Shutter Motor -V544- and connect the connector.
- Insert the Radiator Shutter Motor -V544- with the door in the frame -1-.



- Pay attention that the Radiator Shutter Motor -V544- is seated correctly with the doors in the mount -arrows-.
- Connect the connector -2-.



- Clip in the wiring harness -arrows-.
- Place the seal -2- in the frame for the radiator shutter -1-.



- At the same time pay attention to the installation position in the cut-outs -3 and 4-.
- Clip in the seal -2-.
- Adapt the Radiator Shutter Motor -V544- using the Vehicle Diagnostic Tester.
 - ◆ 0001 - basic setting
 - ◆ 0001 - Adaptation of the Radiator Shutter Motor - V544

Tightening Specifications

- ◆ Refer to [-4.3 Radiator Shutter", page 269](#)
- ◆ Refer to [-4.3.2 Radiator Shutter Components", page 271](#)



5 Special Tools

Special tools and workshop equipment required

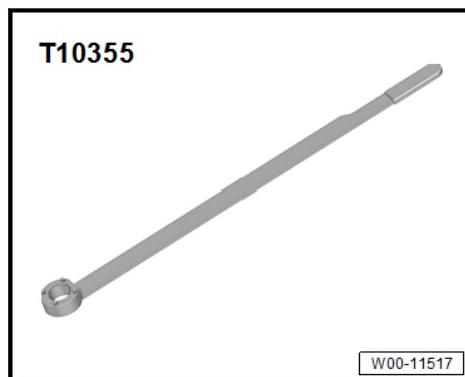
T10007 A	VAS 6208
A refractometer with a cylindrical body and a small probe at the end.	A rectangular drip tray with a grid pattern of small holes along its bottom edge.
VAS 6340	VAS 6096
A pair of pliers specifically designed for gripping and removing hose clips.	A complex assembly of hoses, fittings, and a pressure gauge used for charging cooling systems.
V.A.G 1274/8	
A threaded adapter used in conjunction with a VAG1274/8 tester.	

W19-10066

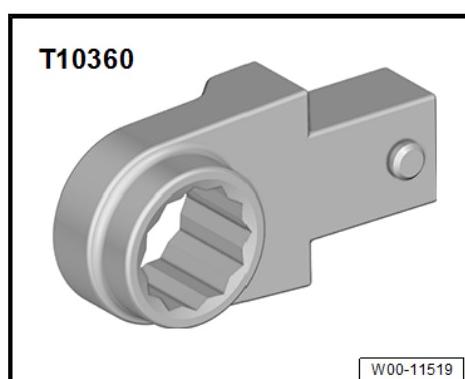
- ◆ Refractometer -T10007A-
- ◆ Shop Crane - Drip Tray -VAS6208-
- ◆ Hose Clip Pliers -VAS6340-
- ◆ Cooling System Charge Kit -VAS6096-
- ◆ Cooling System Tester - Adapter -VAG1274/8-
- ◆ Protective Eyewear
- ◆ Safety Gloves



- ◆ Counterhold - Vibration Damper -T10355-



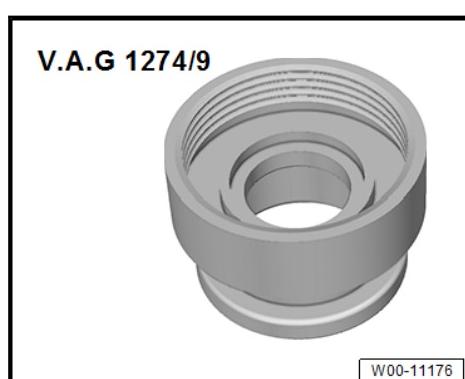
- ◆ Torque Wrench 1331 Insert - Ring Wrench - 12mm -T10360-



- ◆ Cooling System Tester -VAG1274B-



- ◆ Cooling System Tester - Adapter -VAG1274/9-





- ◆ Hose Clip Pliers -VAS6362-

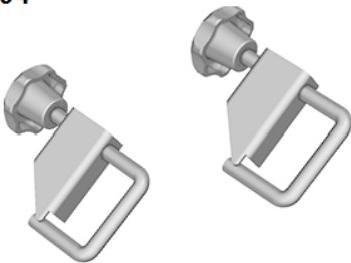
VAS 6362



W00-11227

- ◆ Hose Clamps - Up To 25 mm -3094-

3094



W00-11130



21 – Turbocharger, Supercharger

1 Turbocharger

[⇒ -1.1 Turbocharger", page 286](#)

[⇒ R1.2 removing and Installing", page 292](#)

1.1 Overview - Turbocharger

[⇒ -1.1.1 Turbocharger, Mahle Charge Air Pressure Actuator V465 ", page 286](#)

[⇒ -1.1.2 Turbocharger, Cooper Charge Air Pressure Actuator V465 ", page 289](#)

1.1.1 Overview - Turbocharger, Mahle Charge Air Pressure Actuator -V465-

**1 - Heat Shield****2 - Bolt**

- 9 Nm

3 - Bolt

- 20 Nm

4 - Bolt

- 9 Nm

5 - Charge Air Pressure Actuator -V465-

- Can be replaced only with the turbocharger. Refer to [R1.2 removing and Installing](#), page 292 .

6 - Bolt

- Do not remove the Charge Air Pressure Actuator -V465-.
- Replace turbocharger after loosening bolt.

7 - Nut

- 7 Nm

8 - Bolt

- 7 Nm

9 - Bolt

- Do not remove the Charge Air Pressure Actuator -V465-.
- Replace turbocharger after loosening bolt.

10 - Turbocharger Recirculation Valve -N249-**11 - O-ring**

- Replace after removing

12 - Turbocharger

- Removing and installing. Refer to [R1.2 removing and Installing](#), page 292 .

13 - Spring Clip**14 - O-ring**

- Replace after removing
- Coat with coolant

15 - Coolant Return Line**16 - Bolt**

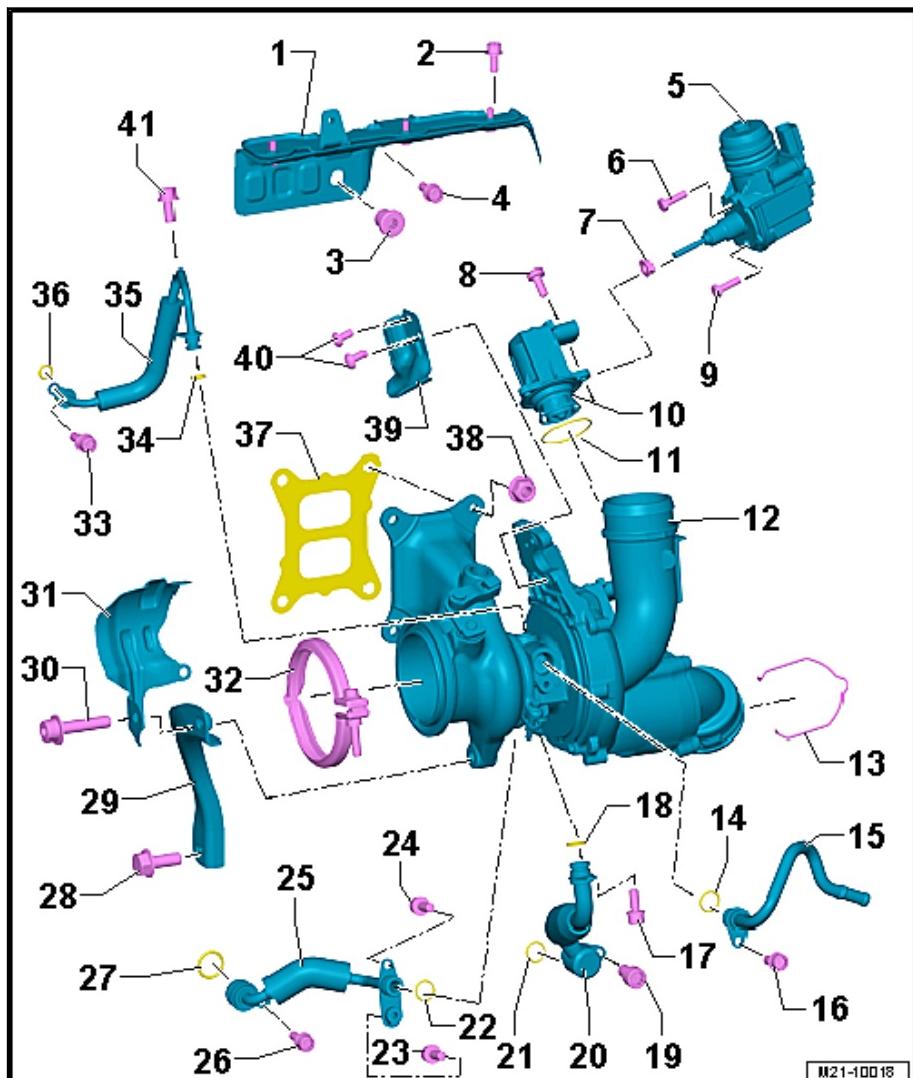
- 9 Nm

17 - Bolt

- 9 Nm

18 - O-ring

- Replace after removing
- Coat with engine oil





19 - Bolt

- 25 Nm

20 - Oil Return Pipe

21 - O-ring

- Replace after removing
- Coat with engine oil

22 - O-ring

- Replace after removing
- Coat with coolant

23 - Bolt

- 9 Nm

24 - Bolt

- 9 Nm

25 - Coolant Supply Line

26 - Bolt

- 9 Nm

27 - O-ring

- Replace after removing
- Coat with coolant

28 - Bolt

- 30 Nm

29 - Support Brace

30 - Bolt

- 30 Nm
- Lubricate the thread with hot bolt paste before loosening and installing. Refer to the Parts Catalog.

31 - Heat Shield

32 - V-Clamp

- 15 Nm
- Replace after removing

33 - Bolt

- 9 Nm

34 - O-ring

- Replace after removing
- Coat with engine oil

35 - Oil Supply Line

36 - O-ring

- Replace after removing
- Coat with engine oil

37 - Seal

- Replace after removing

38 - Nut

- 25 Nm
- Replace after removing

39 - Heat Shield

40 - Bolt



4.5 Nm

41 - Bolt

9 Nm

1.1.2 Overview - Turbocharger, Cooper Charge Air Pressure Actuator -V465-



1 - Heat Shield

2 - Bolt

- 9 Nm

3 - Bolt

- 20 Nm

4 - Bolt

- 9 Nm

5 - Charge Air Pressure Actuator -V465-

- Can be replaced only with the turbocharger. Refer to [R1.2 removing and Installing](#), page 292 .

6 - Bolt

- Do not remove the Charge Air Pressure Actuator -V465-.
- Replace turbocharger after loosening bolt.

7 - Nut

- 7 Nm

8 - Bolt

- 7 Nm

9 - Bolt

- Do not remove the Charge Air Pressure Actuator -V465-.
- Replace turbocharger after loosening bolt.

10 - Turbocharger Recirculation Valve -N249-

11 - O-ring

- Replace after removing

12 - Turbocharger

- Removing and installing. Refer to [R1.2 removing and Installing](#), page 292 .

13 - Spring Clip

14 - O-ring

- Replace after removing
- Coat with coolant

15 - Coolant Return Line

16 - Bolt

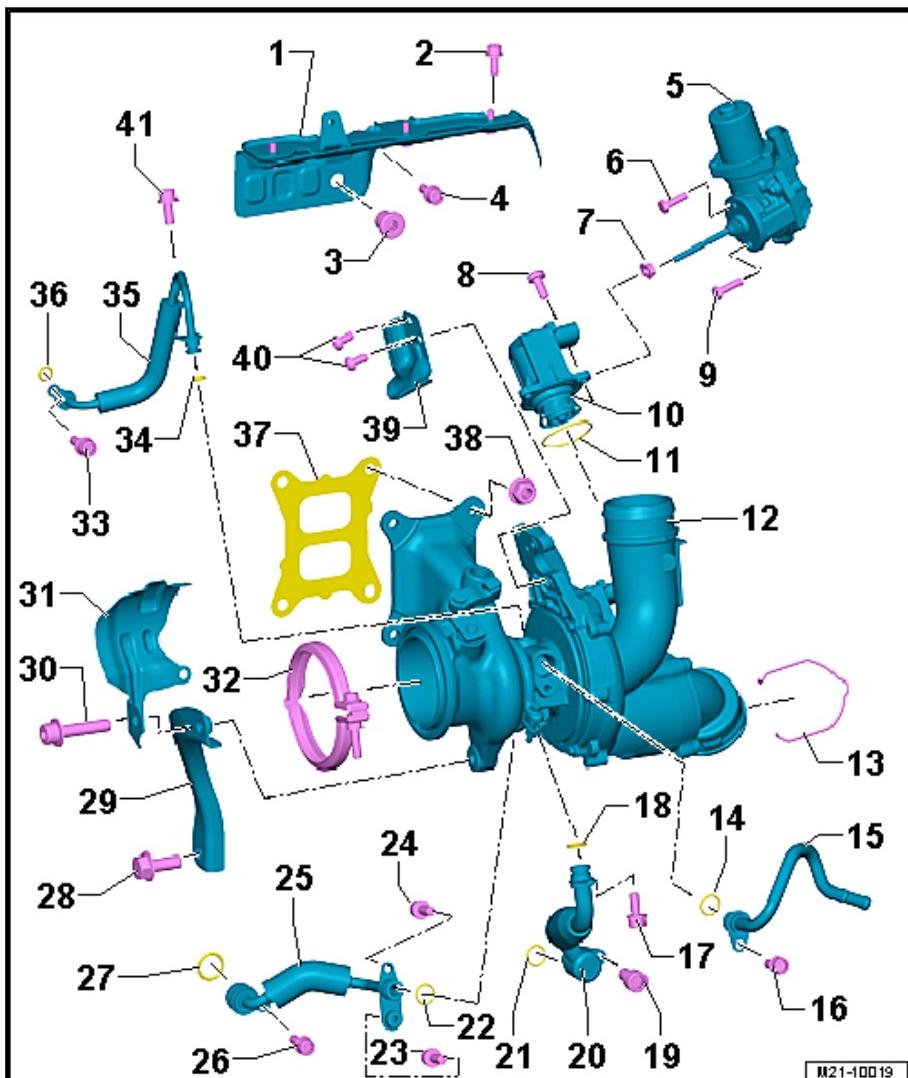
- 9 Nm

17 - Bolt

- 9 Nm

18 - O-ring

- Replace after removing
- Coat with engine oil



**19 - Bolt**

- 25 Nm

20 - Oil Return Pipe**21 - O-ring**

- Replace after removing
- Coat with engine oil

22 - O-ring

- Replace after removing
- Coat with coolant

23 - Bolt

- 9 Nm

24 - Bolt

- 9 Nm

25 - Coolant Supply Line**26 - Bolt**

- 9 Nm

27 - O-ring

- Replace after removing
- Coat with coolant

28 - Bolt

- 30 Nm

29 - Support Brace**30 - Bolt**

- 30 Nm

Lubricate the thread with hot bolt paste before loosening and installing. Refer to the Parts Catalog.

31 - Heat Shield**32 - V-Clamp**

- 15 Nm
- Replace after removing

33 - Bolt

- 9 Nm

34 - O-ring

- Replace after removing
- Coat with engine oil

35 - Oil Supply Line**36 - O-ring**

- Replace after removing
- Coat with engine oil

37 - Seal

- Replace after removing

38 - Nut

- 25 Nm
- Replace after removing

39 - Heat Shield**40 - Bolt**



4.5 Nm

41 - Bolt

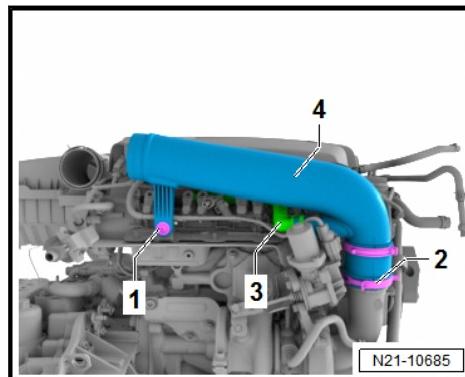
9 Nm

1.2 Turbocharger, Removing and Installing

Special tools and workshop equipment required

- ◆ Bits for VAG1331/13 -T10099-
- ◆ Socket - Xzn 10 -T10154-
- ◆ Torque Wrench 1331 5-50Nm -VAG1331-
- ◆ Spring Clip Pliers
- ◆ Engine Bung Set -VAS6122-
- ◆ Hot Bolt Paste. Refer to the Parts Catalog.

Item -3- with Two Different Versions



Item -3-, Version 1 with Two Locking Tabs

- push the locking mechanism on the crankcase ventilation hose -3- together and remove the hose.

Item -3-, Version 2 without Locking Tabs

- Lay the air guide pipe with the connected line -3- on the cylinder head.



Note

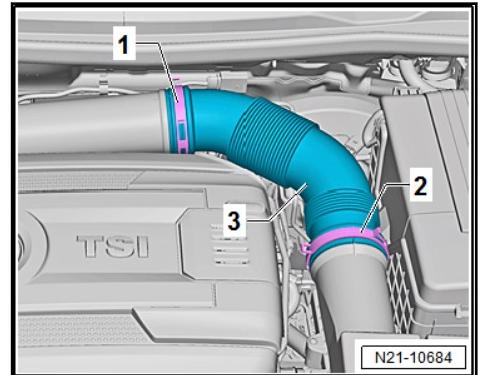
- ◆ If mechanical damage (such as a destroyed compression wheel) is found on the turbocharger, just replacing the turbocharger is not enough. To avoid subsequent damage later, perform the following steps:
 - ◆ Check the air filter housing, air filter element and air duct hoses for contamination.
 - ◆ Check the entire charge air circuit and charge air cooler for foreign objects.
 - ◆ If there are foreign objects in the charge air system, clean the charge air circuit and replace the charge air cooler if necessary.

Removing

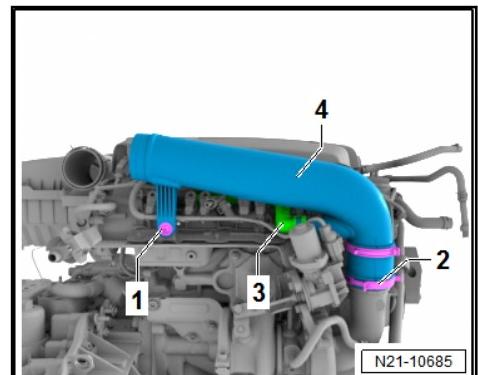
- Remove the engine cover. Refer to [C3.1 over, Removing and Installing](#), page 40 .



- Open the clamps -1 and 2- and remove the connecting pipe -3-.



- Remove the air duct pipe bolt -1-.



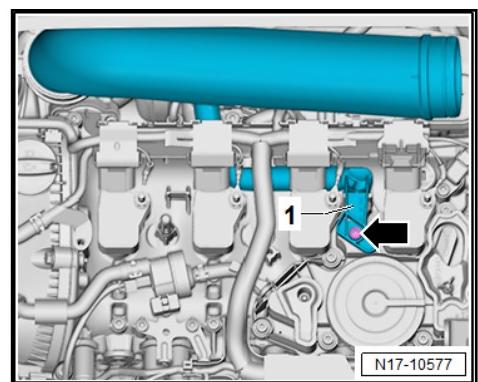
- Loosen the hose clamp -2- and remove the air duct pipe from the turbocharger.

Item -3-, Version 1 with Two Locking Tabs

- Push the locking mechanism on the crankcase ventilation hose -3- together and remove the hose.

Item -3-, Version 2 without Locking Tabs

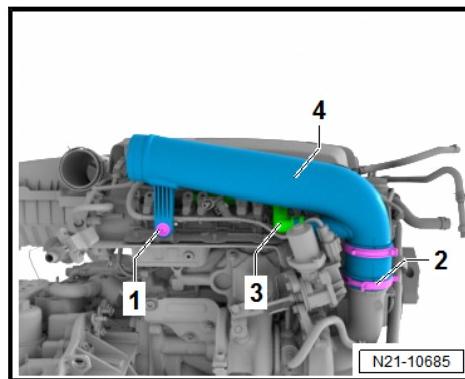
- Remove the bolt -arrow- from the oil separator.



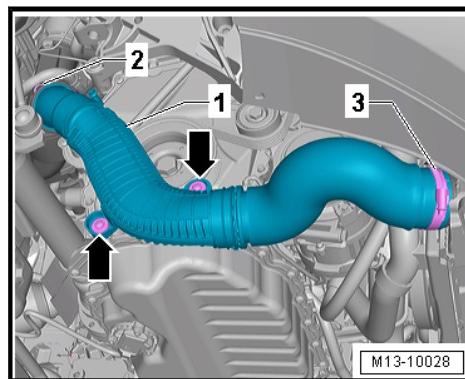
- Remove the lines -1- from the oil separator.



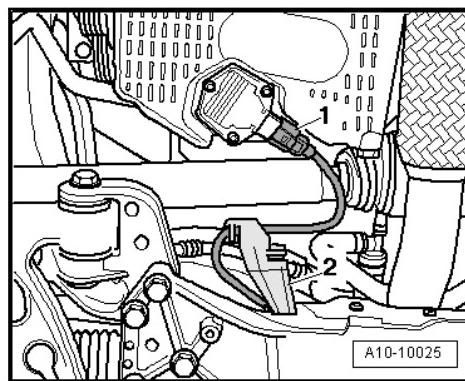
Continuation for All Vehicles



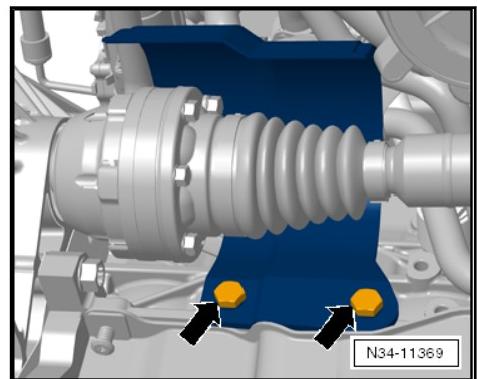
- Remove the air duct pipe -4-.
- Drain the coolant. Refer to [D1.3 raining and Filling](#), page [239](#).
- Remove the bolts -arrows-.



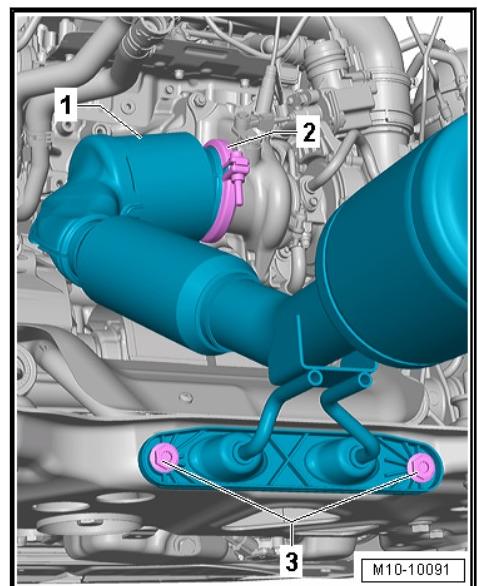
- Lift clamp -2- and remove charge air hose from the connection.
- Disconnect the connector -1- for the Oil Level Thermal Sensor -G266-. Unclip the bracket -2- from the subframe.



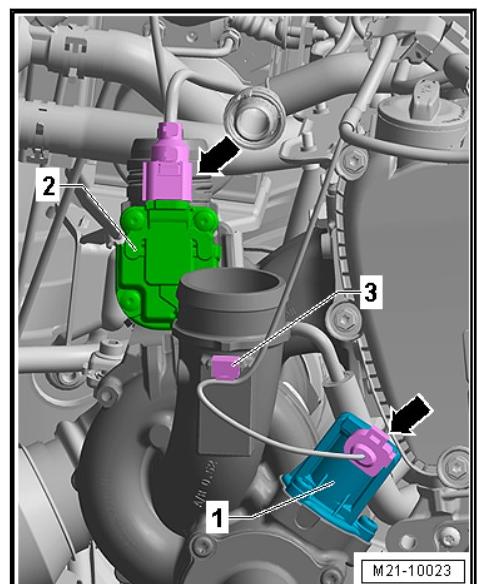
- Remove the bolts -arrows-.



- Remove the right drive axle heat shield.
- Remove the catalytic converter with the front exhaust pipe.
Refer to [C2.2 onverter, Removing and Installing](#), page [374](#).

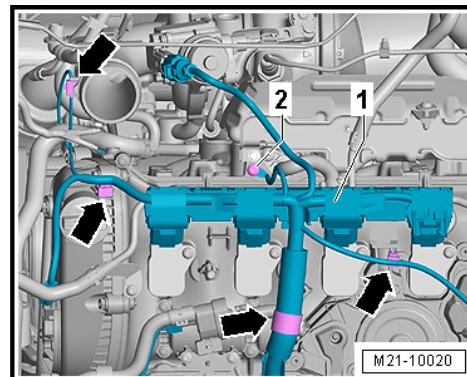


- Disconnect the connectors -arrows- from the Turbocharger Recirculation Valve -N249- -1- and Charge Air Pressure Actuator -V465- -2-.

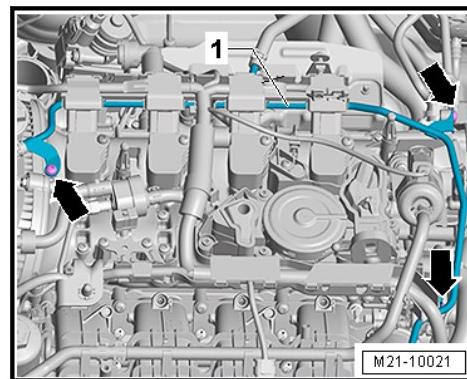




- Loosen clip -3- and free up wire.
- Open the clips -arrows- and free up the wiring harness.



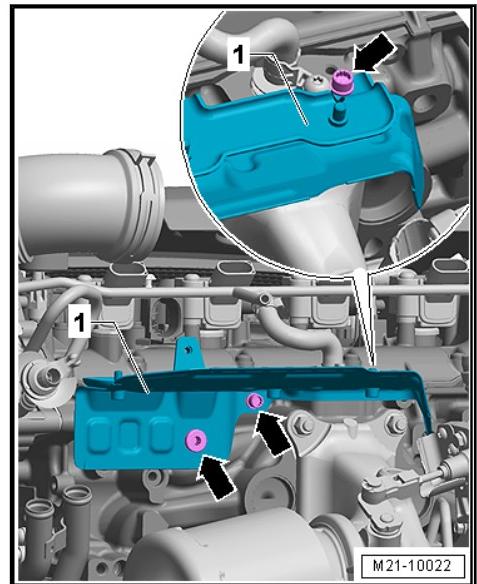
- Remove ground connection -2- from camshaft housing.
- Remove the connector strip -1- from the Ignition Coils with Power Output Stages evenly and place the wiring harness aside.
- Remove bolts -arrows- and leave coolant line -1- in installed position.



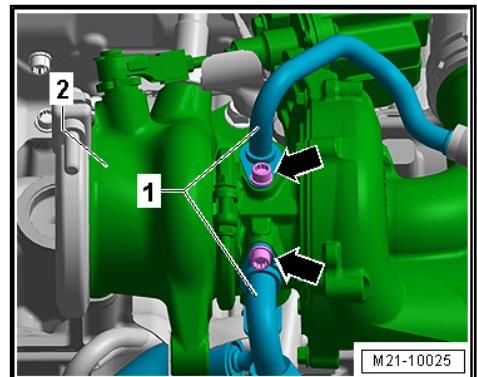
 Note

Clearance is needed to remove the turbocharger.

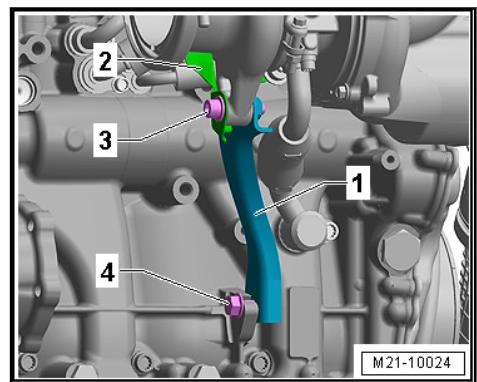
- Remove the bolts -arrows- and the heat shield -1-.



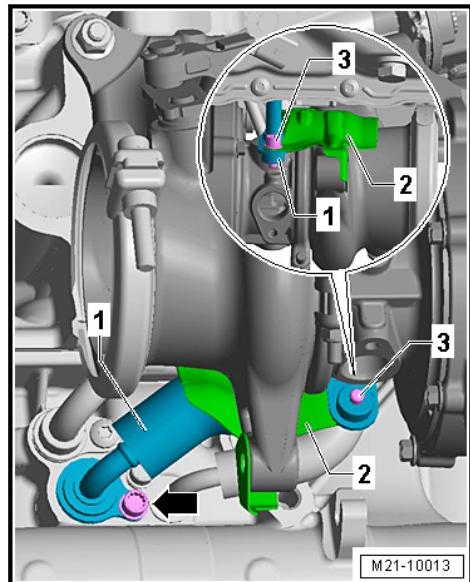
- Remove bolts -arrows- and remove lines -1- from turbocharger -2-.



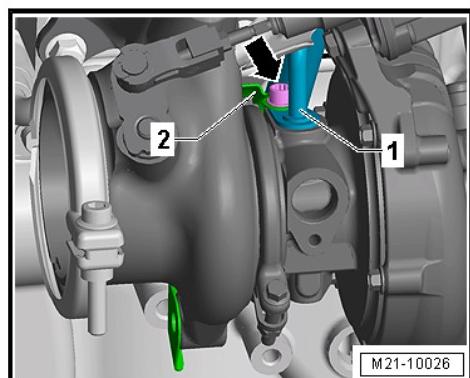
- Clean bolt -3- before loosening and lubricate the thread with hot bolt paste. Refer to the Parts Catalog.
- Remove bolt -3 and 4- and remove support brace -1-.



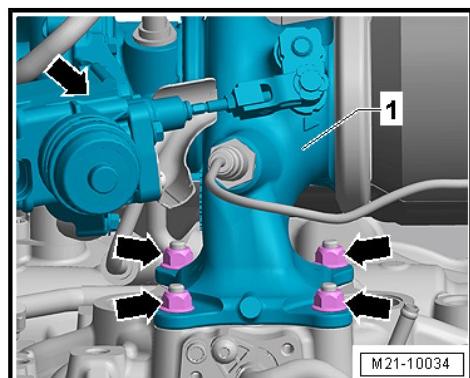
- Remove the bolt -arrow- using the -T10154-. Remove the line -1- straight off the engine.



- Remove the bolt -3-.
- Remove the bolt -arrow-.



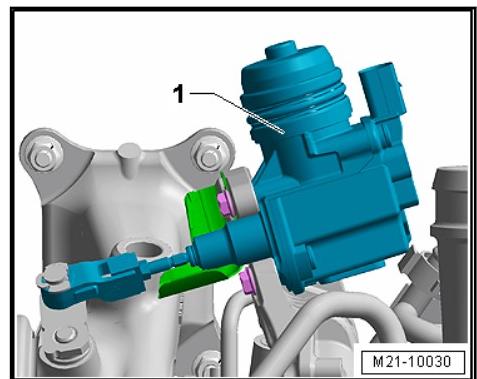
- Remove oil supply line -1- and heat shield -2- from turbocharger.
- Remove the nuts -arrows-.



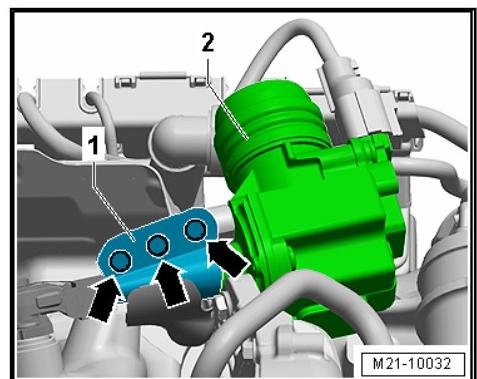
- Remove the turbocharger/exhaust manifold upward.



Turbocharger with Mahle Charge Air Pressure Actuator -V465-



- This Charge Air Pressure Actuator -V465- has a protective boot.



- Remove the boot from the Charge Air Pressure Actuator -V465- and mount it on the new turbocharger.

Continuation for All Vehicles

- Seal the turbocharger with the -VAS6122-.

Installing

Note

- ◆ If mechanical damage (such as a destroyed compression wheel) is found on the turbocharger, just replacing the turbocharger is not enough. To avoid subsequent damage later, perform the following steps:
- ◆ Check the air filter housing, air filter element and air duct hoses for contamination.
- ◆ Check the entire charge air circuit and charge air cooler for foreign objects.
- ◆ If there are foreign objects in the charge air system, clean the charge air circuit and replace the charge air cooler if necessary.

Install in reverse order of removal. Note the following:

- ◆ Hose connections and charge air system hoses must be free of oil and grease before installing. On connector couplings, the seal and sealing surfaces must only be lightly oiled.
- ◆ Install only approved clamps for securing hose connections. Refer to Parts Catalog.
- ◆ Replace gaskets, seals and self-locking nuts.

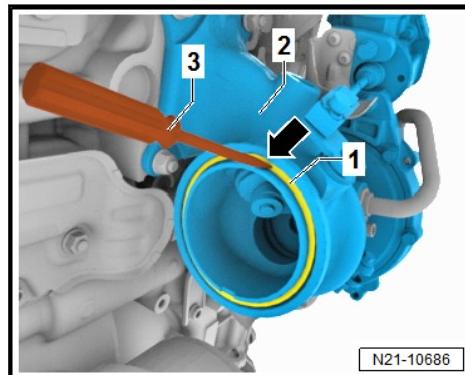


Jetta 2011 >, Jetta 2015 >

4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

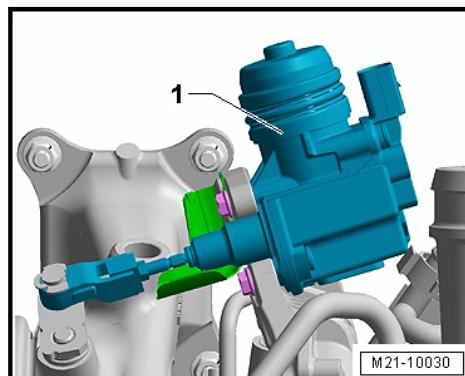
- ◆ Replace the turbocharger clamp and catalytic converter after removing.
- ◆ Fill the turbocharger with engine oil at the connection for oil supply line.
- ◆ After installing the turbocharger, let the engine run at idle for approximately one minute and without increasing the engine speed. This ensures the turbocharger is supplied with oil.

After Reinstalling the Turbocharger

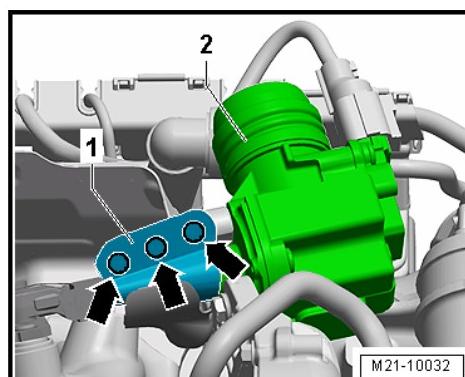


- Pry out the seal -1- from the turbocharger -2-. Insert the screwdriver -3- in the opening -arrow-.

Turbocharger with Mahle Charge Air Pressure Actuator -V465-



- This Charge Air Pressure Actuator -V465- has a protective boot.



**Note**

- ◆ Check the boot for damage before installing and replace if necessary. Refer to the Parts Catalog.
 - ◆ After installing, check the boot for correct seating.
 - ◆ The Charge Air Pressure Actuator -V465- function must not be impaired.
- Place the boot -1- as shown around the Charge Air Pressure Actuator -V465- -2-. Close the snap fasteners -arrows-.
- After installing new parts (engine/partial engine, cylinder head or turbocharger) limit the oil pressure regulation for approximately 1000 km to the higher pressure stage. From this, the higher friction is taken into account when breaking in new components, and the optimum removal of particles from the initial wear in is ensured. To do this connect the vehicle diagnostic tester, switch on the ignition and select the following menu items:
- ◆ [01 – Engine electronics]
 - ◆ [Guided Functions]
 - ◆ [01 – Oil Pressure Regulation/Retraction Activating]

Tightening Specifications

- ◆ Refer to [⇒ -1.1 Turbocharger](#), page 286
- ◆ Refer to [⇒ -2.1 Emissions Control](#), page 374



2 Charge Air System

- ⇒ [-2.1 Charge Air System", page 302](#)
- ⇒ [A2.2 ir Cooler, Removing and Installing", page 304](#)
- ⇒ [C2.3 harge Air Pressure Sensor G31, Removing and Instal-
ling", page 306](#)
- ⇒ [A2.4 ir System, Checking for Leaks", page 307](#)

2.1 Overview - Charge Air System

**1 - Air Duct Hose**

- Installing. Refer to [Fig. "Air Guides with Screw-Type Clamps, Installing"](#), page 304 .

2 - Rubber Bushing

- For the charge air cooler
- Left

3 - Bolt

- 8 Nm

4 - Charge Air Cooler

- Removing and installing. Refer to [A2.2 in "Cooler, Removing and Installing"](#), page 304 .

5 - Rubber Bushing

- For the charge air cooler
- Right

6 - Bolt

- 8 Nm

7 - Rubber Bushing

- For lower charge air cooler in body
- Right

8 - Rubber Bushing

- For lower charge air cooler in body
- Left

9 - Gasket

- Replace if damaged

10 - Bolt

- 7 Nm

11 - Air Duct Hose

- Installing. Refer to [Fig. "Air Guides with Screw-Type Clamps, Installing"](#), page 304 .

12 - Spring Clip

- Check for proper seating

13 - Bolt

- 7 Nm

14 - Air Duct Pipe**15 - Bolt**

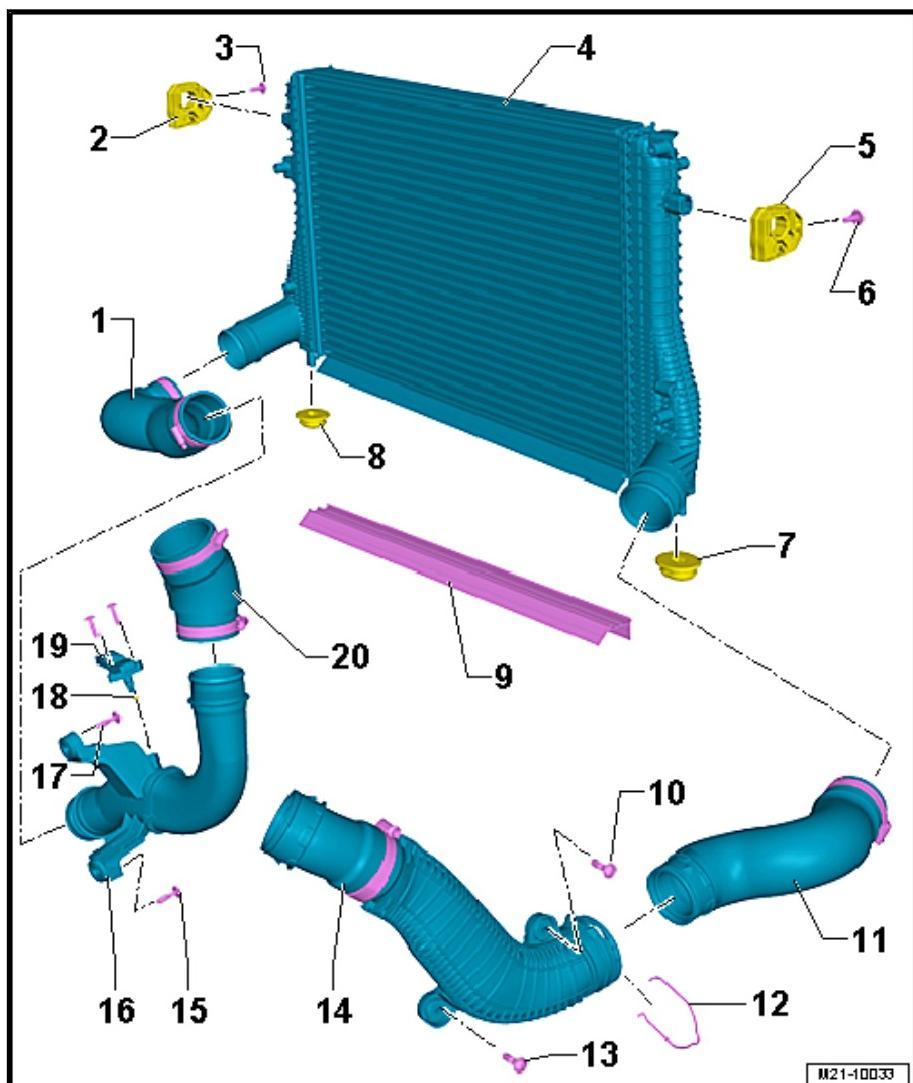
- 7 Nm

16 - Air Duct Pipe**17 - Bolt**

- 7 Nm

18 - O-ring

- Is a component of the Charge Air Pressure Sensor - G31-





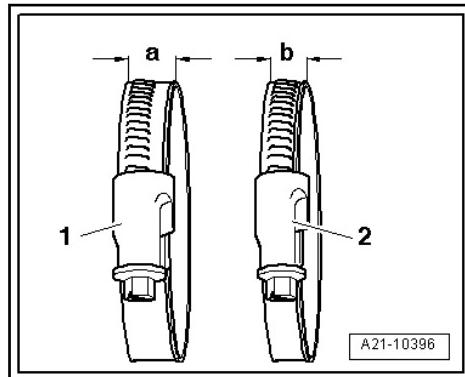
19 - Charge Air Pressure Sensor -G31-

- Replace the Charge Air Pressure Sensor -G31- after removal
- Removing and installing. Refer to [C2.3 Charge Air Pressure Sensor G31, Removing and Installing](#), page 306.

20 - Air Duct Hose

- Installing. Refer to [Fig. "Air Guides with Screw-Type Clamps, Installing"](#), page 304.

Air Guides with Screw-Type Clamps, Installing



Note

- ◆ The hose connections as well as air duct pipes and hoses must be free of oil and grease before installing.
- ◆ Secure all hose connections with hose clamps that match the ones used in series production. Refer to the Parts Catalog.
- ◆ To safely secure the air duct hoses to their connections, spray the screws on the previously used screw-type clamps with rust remover.

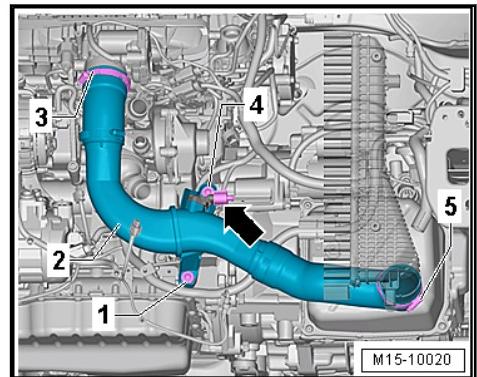
Tightening Specifications

Hose Clamp	Width	Tightening Specification
-1-	-a- = 13 mm wide	5.5 Nm
-2-	-b- = 9 mm wide	3 Nm

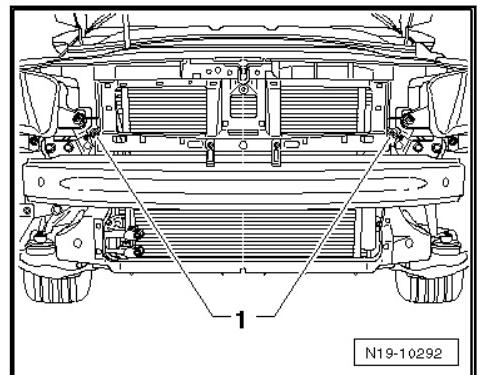
2.2 Charge Air Cooler, Removing and Installing

Removing

- Remove the radiator. Refer to [R4.4 removing and Installing](#), page 272.
- Loosen the hose clamp -3 and 5-.



- Disconnect the connector from the Charge Air Pressure Sensor -G31- -arrow-.
- Remove the bolts -1 and 4- and then remove the air duct pipe downward.
- Seal the open lines and connections with clean plugs from the -VAS6122-.
- Remove the bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63; Front Bumper; Bumper Cover, Removing and Installing.
- Remove the charge air cooler bracket bolts -1-.



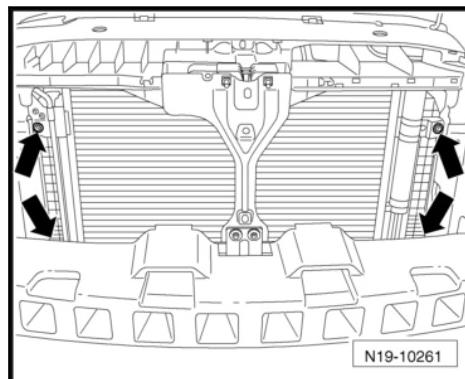
Vehicles with A/C System



Note

The condenser bolts are difficult to access. Lift the charge air cooler out of the lower cooler mounts with a second technician. Now the charge air cooler can be moved »back and forth« and the bolts are accessible.

- Remove the condenser from the charge air cooler -arrows-.



- Attach the condenser and the cable tie to the lock carrier.

Continuation for All Vehicles

- Remove the charge air cooler downward.

Installing

Install in reverse order of removal. Note the following:

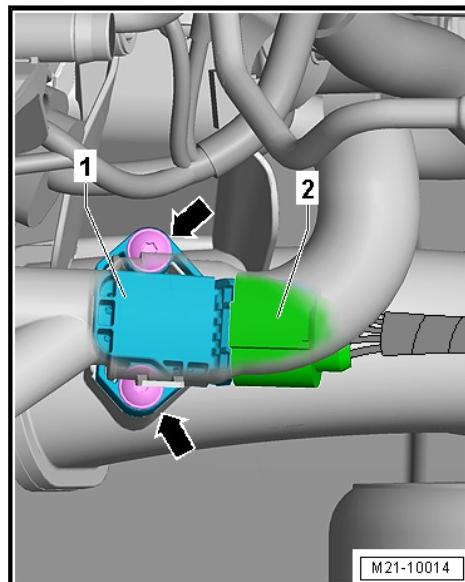
Tightening Specifications

- ◆ Refer to [⇒ -2.1 Charge Air System](#), page 302
- ◆ Refer to [⇒ -4.1 Radiator/Radiator Fan](#), page 267
- ◆ Refer to [⇒ Body Exterior; Rep. Gr. 63; Front Bumper; Overview - Bumper Cover](#).

2.3 Charge Air Pressure Sensor -G31-, Removing and Installing

Removing

- Remove the air filter housing. Refer to [⇒ F3.2 Filter Housing, Removing and Installing](#), page 329 .
- Disconnect the connector -2-.



- Remove the bolts -arrows- and pull the Charge Air Pressure Sensor -G31- -1- out of the air duct pipe and remove it upward.



The bolts are each accessible in front of and behind the coolant hose from above.

Installing

Install in reverse order of removal and note the following:

- Reinstalling the Charge Air Pressure Sensor -G31- is not possible. A new Charge Air Pressure Sensor -G31- must be installed.

Tightening Specifications

- ◆ Refer to [-2.1 Charge Air System](#), page 302
- ◆ Refer to [-3.1 Air Filter Housing](#), page 327

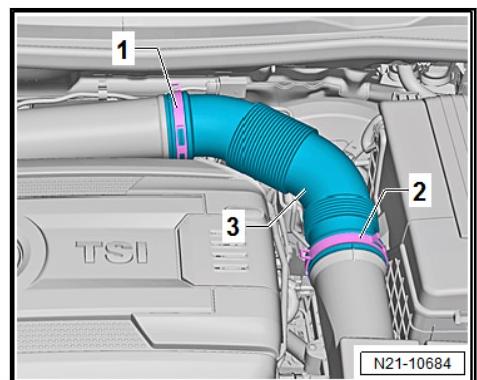
2.4 Charge Air System, Checking for Leaks

Special tools and workshop equipment required

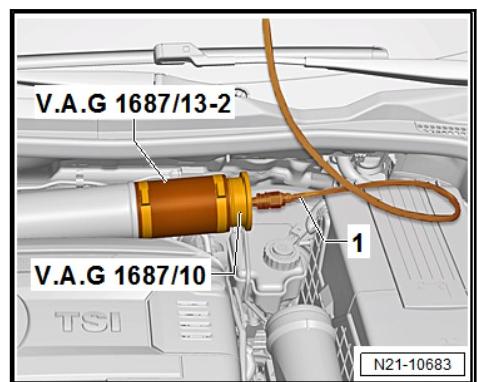
- ◆ Turbo System Tester Kit -VAG1687-

Procedure

- Loosen the hose clamps -1 and 2- and remove the air duct pipe -3-.

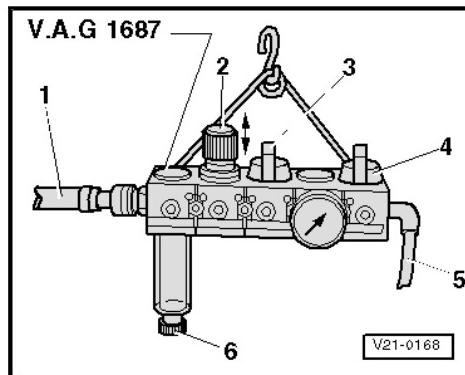


- Connect the -VAG1687/10- with the -VAG1687/13-2- to the turbocharger.



- Connect the hose -1- for the -VAG1687- to the adapter.

Prepare the -VAG1687- as follows:



- Pull the pressure regulating valve -2- upward and remove completely, close the valves -3 and 4-.
- Connect the -VAG1687- to compressed air -1- with a commercially available adapter piece.

Note

- ◆ If there is water in the viewing glass, it must be drained through the drain plug -6-.
- ◆ Pressure must not exceed 0.5 bar (7.2 psi)!
- Open the valve -3-.
- Set the pressure to 0.5 bar (7.2 psi) using the pressure control valve -2-.
- Open the valve -4- and wait until the test circuit is filled. Regulate the pressure to 0.5 bar (7.2 psi) again if necessary.
- Listen, feel and use commercially available leak detection spray or the -VAG1842- to check the charge air system for leaks.

Note

- ◆ A small quantity of air dissipates via the valves in the engine. For this reason a pressure retention test is not possible.
- ◆ Information on the -VAG1842S-. Refer to the Operating Instructions.
- ◆ Release the pressure in the test circuit by pulling off the hose coupling before removing the adapter.

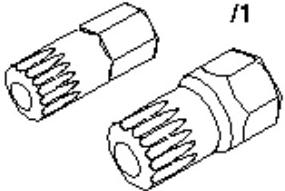
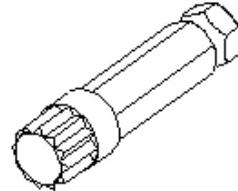
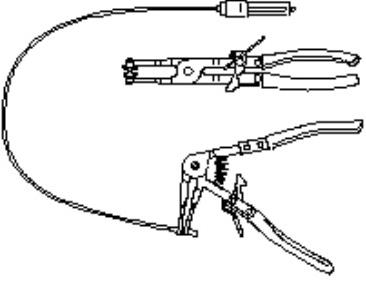
Assembling

Assembly is performed in reverse order of removal.



3 Special Tools

Special tools and workshop equipment required

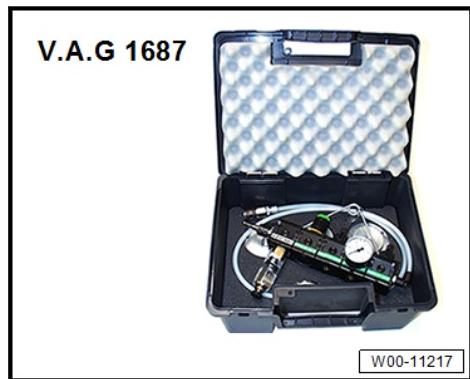
T10099  /1	T10154 
V.A.G 1331 	VAS 5024 A 
VAS 6122 	W21-10003

- ◆ Bits for VAG1331/13 -T10099-
- ◆ Socket - Xzn 10 -T10154-
- ◆ Torque Wrench 1331 5-50Nm -VAG1331-
- ◆ Spring Clip Pliers
- ◆ Engine Bung Set -VAS6122-
- ◆ Hot Bolt Paste. Refer to the Parts Catalog.



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4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

- ◆ Turbo System Tester Kit -VAG1687-





24 – Multiport Fuel Injection

1 Injection System

[⇒ L1.1 Location Overview - Injection System", page 311](#)

[⇒ F1.2 Fuel Pressure, Reducing \(Not for North American Market\)", page 314](#)

1.1 Component Location Overview - Injection System



1 - Camshaft Adjustment Valve 1 -N205-

- Removing and installing. Refer to [C4.3 amshaft Adjustment Valve 1N205, Removing and Installing](#), page 185 .

2 - Ignition Coil 1 with Power Output Stage -N70-

- Removing and installing. Refer to [C1.3 ols with Power Output Stages, Removing and Installing](#), page 386 .

3 - Turbocharger Recirculation Valve -N249- and Charge Air Pressure Actuator -V465-

- Components are installed directly on the turbocharger
- Removing and installing. Refer to [-1.1 Turbocharger](#), page 286 .

4 - Charge Air Pressure Actuator -V465-

- Component is installed directly on the turbocharger
- Can be replaced only with the turbocharger
- Removing and installing. Refer to [R1.2 emoving and In-stalling](#), page 292 .

5 - EVAP Canister Purge Regulator Valve 1 -N80-

6 - Oxygen Sensor 1 Before Catalytic Converter -GX10-

- Removing and installing. Refer to [O8.2 xygen Sensor 1 before Catalytic Converter GX10, Removing and Installing](#), page 362 .

7 - Ignition Coil 2 with Power Output Stage -N127-

- Removing and installing. Refer to [C1.3 ols with Power Output Stages, Removing and Installing](#), page 386 .

8 - Ignition Coil 3 with Power Output Stage -N291-

- Removing and installing. Refer to [C1.3 ols with Power Output Stages, Removing and Installing](#), page 386 .

9 - Ignition Coil 4 with Power Output Stage -N292-

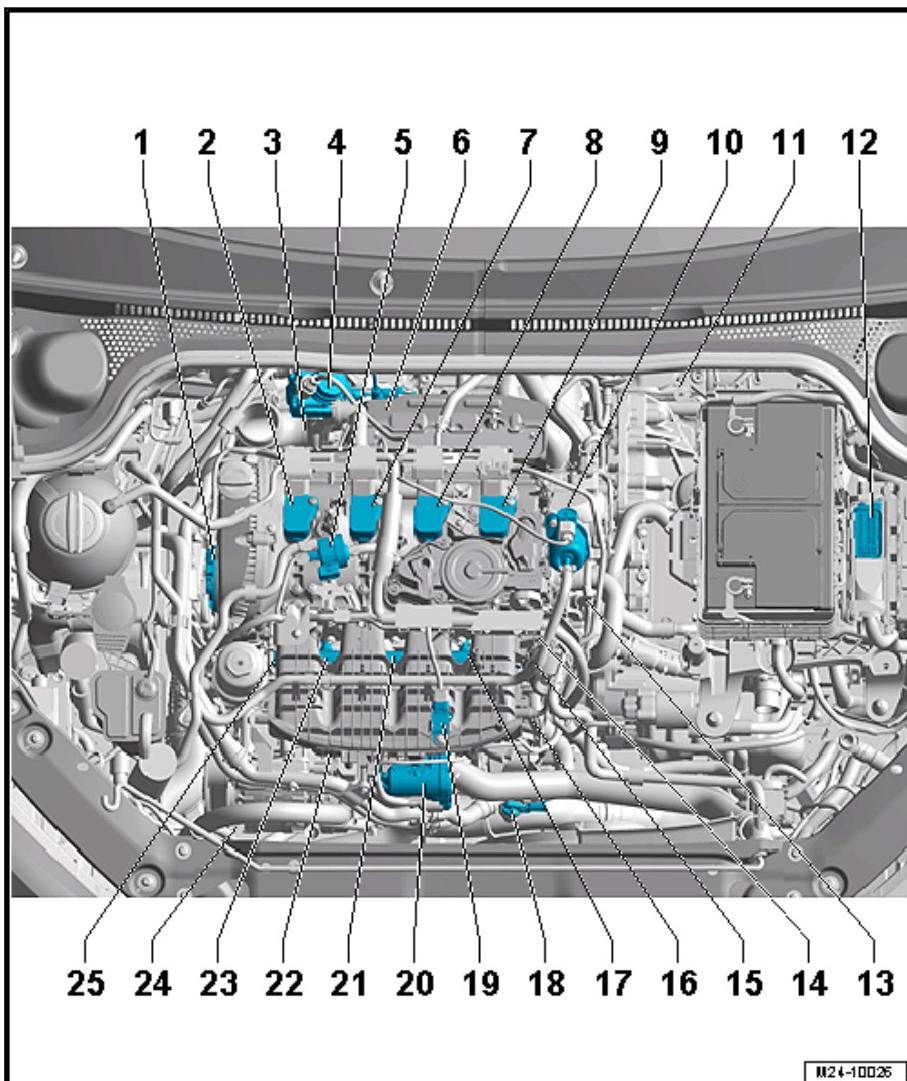
- Removing and installing. Refer to [C1.3 ols with Power Output Stages, Removing and Installing](#), page 386 .

10 - High Pressure Pump with Fuel Pressure Regulator Valve -N276-

- Refer to [-7.1 High Pressure Pump](#), page 355
- Removing and installing. Refer to [P7.2 ressure Pump, Removing and Installing](#), page 357 .

11 - Connector

- For Oxygen Sensor 1 before Catalytic Converter -GX10-





12 - Engine Control Module -J623-

- Removing and installing. Refer to [⇒ E6.1 Engine Control Module J623, Removing and Installing”, page 350](#).

13 - Engine Coolant Temperature Sensor -G62-

- 9 Nm
- Removing and installing. Refer to [⇒ -2.3 Engine Coolant Temperature Sensor”, page 251](#).

14 - Camshaft Position Sensor -G40-

- 9 Nm
- Removing and installing. Refer to [⇒ P1.5 osition Sensor, Removing and Installing”, page 389](#).

15 - Connectors for

- Knock Sensor 1 -G61-
- Intake Manifold Runner Control Valve -N316-
- Camshaft Position Sensor -G40-

16 - Engine Speed Sensor -G28-

- 4 Nm +45°
- Removing and installing. Refer to [⇒ E1.6 engine Speed Sensor G28, Removing and Installing”, page 389](#).
- Coat the seal with oil
- Replacing the bolt

17 - Knock Sensor 1 -G61-

- 20 Nm
- In order to remove, the coolant pump and coolant thermostat must be removed
- Removing and installing. Refer to [⇒ K1.4 knock Sensor 1 G61, Removing and Installing”, page 388](#).

18 - Charge Air Pressure Sensor -G31-

- Removing and installing. Refer to [⇒ C2.3 harge Air Pressure Sensor G31, Removing and Installing”, page 306](#).

19 - Intake Air Temperature Sensor -G42- with Manifold Absolute Pressure Sensor -G71-

20 - Throttle Valve Control Module -GX3-

- Each time the Throttle Valve Control Module -GX3- is removed, installed or replaced, it must be adapted to the Engine Control Module -J623-.

21 - Fuel Injectors

- Removing and installing. Refer to [⇒ I2.3 njectors, Removing and Installing”, page 319](#).

22 - Intake Manifold

- Removing and installing. Refer to [⇒ M4.2 anifold, Removing and Installing”, page 333](#).

23 - Fuel Pressure Sensor -G247-

- 27 Nm
- Removing and installing. Refer to [⇒ F5.3 uel Pressure Sensor G247, Removing and Installing”, page 344](#).

24 - Engine Coolant Temperature Sensor on Radiator Outlet -G83-

- Removing and installing. Refer to [⇒ E2.9 ngine Coolant Temperature Sensor on Radiator Outlet G83, Removing and Installing”, page 262](#).

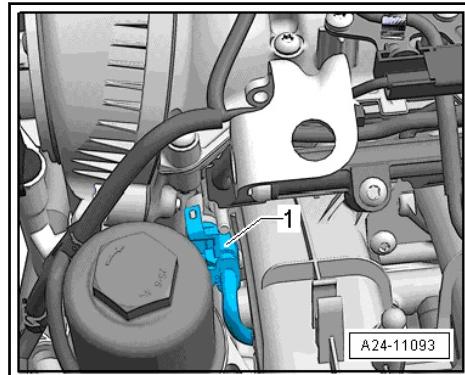
25 - Intake Manifold Runner Position Sensor -G336-

Intake Manifold Runner Position Sensor -G336- -1-

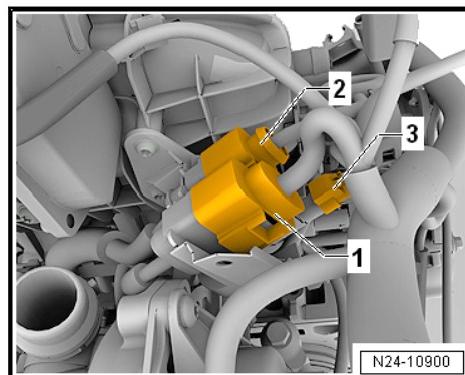


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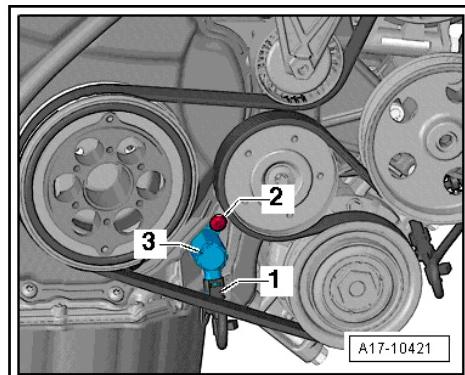
4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021



Connectors



Oil Pressure Regulation Valve -N428- -3-



1.2 High Fuel Pressure, Reducing (Not for North American Market)

NOT FOR NORTH AMERICAN MARKET



CAUTION

The fuel system is under high pressure.

Risk of injury from fuel spraying out.

- Reducing the fuel high pressure.

Fuel High Pressure, Reducing:

- Turn on the ignition and select the following menu items on the Vehicle Diagnostic Tester:
 - ◆ [01 – Engine electronics]
 - ◆ [Guided Functions]
 - ◆ [01 – Reduce high fuel pressure]
- The fuel pressure reduces to a specified value.
- Switch off the ignition.

The fuel rail will continue to be filled with fuel, but it will no longer be under high pressure.

CAUTION

Fuel system is under pressure.

Risk of injury from fuel spraying out.

- Wear protective eyewear.
- Wear safety gloves.
- Reduce the pressure: Lay clean cloths around the connection point and carefully open the connection point.

- After reducing fuel high pressure, place a clean cloth around the connection and open the high pressure system »immediately«. Absorb the discharged fuel.

Note

- ◆ *If the high pressure system is not opened immediately, the pressure will increase because of post-heating.*
- ◆ *The ignition can no longer be switched on, otherwise the pressure will increase again.*



2 Fuel Injectors

- ⇒ [-2.1 Fuel Rail with Fuel Injectors", page 316](#)
- ⇒ [R2.2 ail, Removing and Installing", page 318](#)
- ⇒ [I2.3 njectors, Removing and Installing", page 319](#)
- ⇒ [I2.4 njector Seals, Replacing", page 322](#)
- ⇒ [I2.5 njectors, Cleaning", page 325](#)

2.1 Overview - Fuel Rail with Fuel Injectors

**1 - Fuel Injector**

- Replace the O-rings.
- With combustion chamber seal (Teflon® seal), always replace
- Make sure it is installed in the correct position.
- Removing and installing. Refer to [I2.3 injectors, Removing and Installing](#), page 319 .

2 - Support Ring

- Replace after removing

3 - Fuel Rail for The-Fuel Injector

- 9 Nm.
- Removing and installing. Refer to [R2.2 ail, Removing and Installing](#), page 318 .

4 - Roller Tappet**5 - Fuel Pressure Regulator Valve -N276-****6 - High Pressure Pump**

- With Fuel Pressure Regulator Valve -N276-
- There is an electric fuel pump located in the fuel tank that supplies the fuel to the mechanical high pressure pump.
- Pay attention when installing the high pressure pump, that no dirt enters the fuel system.
- Install the fuel lines free of tension
- Removing and Installing. Refer to [P7.2 ressure Pump, Removing and Installing](#), page 357 .

7 - High Pressure Pump Bolts

- 8 Nm +90°
- Replace after removing

8 - Fuel Supply Line Connection on the High Pressure Pump

- 40 Nm
- Replace after removing

9 - Fuel Supply Line Union Nut

- 27 Nm

10 - Fuel Supply Line Union Nut

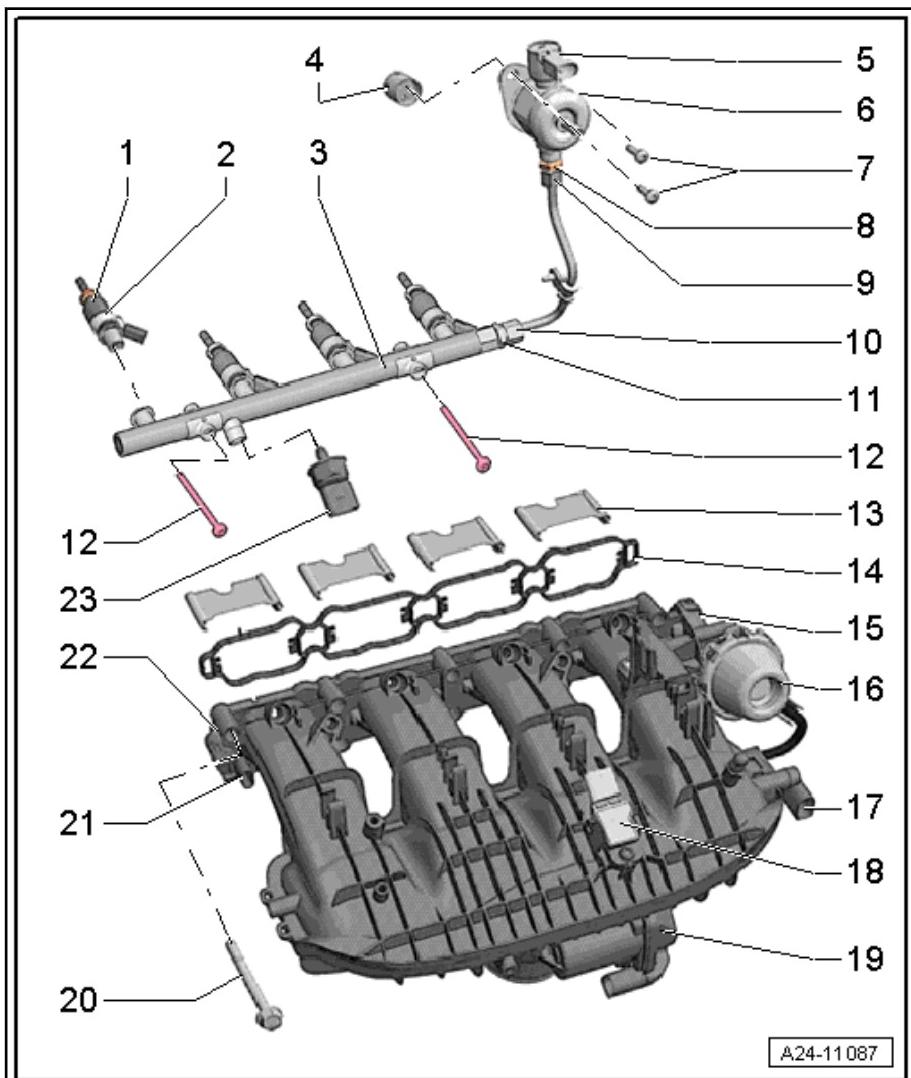
- 27 Nm

11 - Connections for the Fuel Supply Line on the Fuel Rail

- 40 Nm
- Replace after removing

12 - Bolts

- 9 Nm





13 - Channel Separating Plate

14 - Seal

- Check and replace if damaged

15 - Charge-Motion Valve Adjuster (Intake Manifold Flap)

16 - Channel Separating Plate Vacuum Diaphragm (Intake Manifold Flaps)

17 - Intake Manifold Runner Control Valve -N316-

18 - Intake Air Temperature Sensor -G42- with Manifold Absolute Pressure Sensor -G71-

- 5 Nm

19 - Throttle Valve Control Module -GX3-, EPC Throttle Drive -G186-

- 7 Nm
- EPC Throttle Drive Angle Sensor 1 -G187- and EPC Throttle Drive Angle Sensor 2 -G188-
- Each time the Throttle Valve Control Module -GX3- is removed, installed or replaced, it must be adapted to the Engine Control Module -J623-. See "Guided Functions"; to do so, use Vehicle Diagnostic Tester

20 - Bolt for the Intake Manifold

- Item 7- [⇒ Item 7 \(page 332\)](#)

21 - Intake Manifold Runner Position Sensor -G336-

- The Intake Manifold Runner Position Sensor -G336- needs to be adapted to the Engine Control Module -J623- each time it is removed and installed or replaced; see "Guided Functions". To do this, use Vehicle Diagnostic Tester.

22 - Intake Manifold

- Removing and installing. Refer to [⇒ M4.2 anifold, Removing and Installing", page 333](#).

23 - Fuel Pressure Sensor -G247-

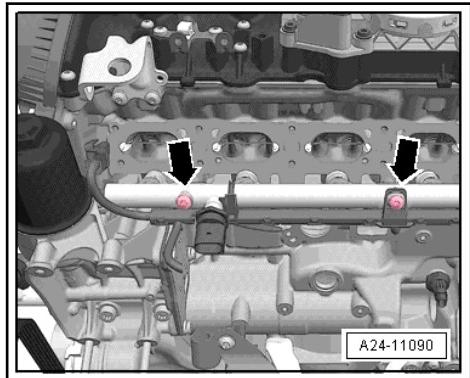
- 27 Nm
- Coat the sealing point and thread with clean engine oil.
- Removing and installing. Refer to [⇒ F5.3 uel Pressure Sensor G247, Removing and Installing", page 344](#).

2.2 Fuel Rail, Removing and Installing

WARNING

- ◆ You must remove the fuse for the fuel pump control module before starting any repairs of the vehicle's fuel system. Failing to do so could result in fire and personal injuries.
- ◆ Do not turn on the ignition, open the front doors, or attempt to start the engine at any time while any part of the vehicle's fuel system is unassembled. Failing to heed this warning could result in fire and personal injury

- Intake manifold must be removed. For removing the intake manifold. Refer to [⇒ M4.2 anifold, Removing and Installing", page 333](#).
- Disconnect the connector on the Fuel Pressure Sensor - G247-.
- Remove all connectors from the fuel injectors.
- Remove bolts -arrows- from the fuel rail.



- Remove fuel rail from the cylinder head.

Installing

- Install in reverse order of removal.
- Install the intake manifold. Refer to [M4.2 anifold, Removing and Installing](#), page 333 .

Tightening Specifications

- ◆ Refer to [-2.1 Fuel Rail with Fuel Injectors](#), page 316

2.3 Fuel Injectors, Removing and Installing



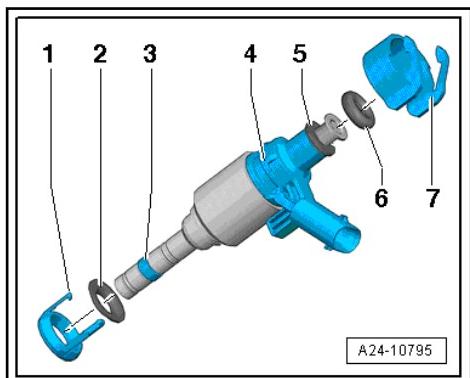
WARNING

- ◆ You must remove the fuse for the fuel pump control module before starting any repairs of the vehicle's fuel system. Failing to do so could result in fire and personal injuries.
- ◆ Do not turn on the ignition, open the front doors, or attempt to start the engine at any time while any part of the vehicle's fuel system is unassembled. Failing to heed this warning could result in fire and personal injury

Special tools and workshop equipment required

- ◆ Injector/Combustion Chamber Seal Tool Set -T10133C-

Overview - Fuel Injector



1 - Replace intermediate ring

2 - Replace the mount

3 - Combustion Chamber Seal (Teflon® Seal) - replace; the seal must not be greased or be treated with any other lubricant during installation.

4 - Fuel Injector



- 5 - Replace the spacer ring
- 6 - Replace the O-ring (lightly coat with clean engine oil during installation)
- 7 - Replace the support ring (via this support ring, fuel rail utilizes the force to hold the fuel injector in place in the cylinder head).

Removing



Note

The fuel injectors can only be removed when the engine is cold.

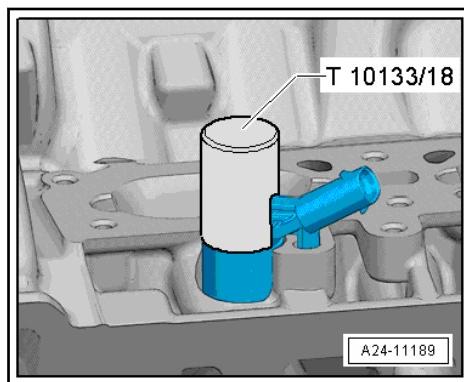
- Remove intake manifold. Refer to [M4.2 anifold, Removing and Installing](#), page 333 .
- Remove fuel rail. Refer to [R2.2 ail, Removing and Instal-ling](#), page 318 .

Remove Fuel Injectors in the Event That They Are Stuck in the Fuel Rail.

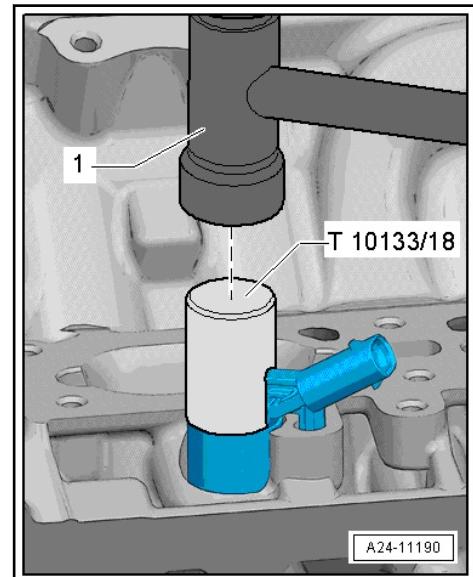
Carefully remove the fuel injectors from the fuel supply pipe.

Remove Fuel Injectors in the Event That They Are Stuck in the Cylinder Head.

- Cover the open intake channels with a clean cloth.
- Remove the electrical connector on the fuel injector that is about to be removed.
- Push the -T10133/18- over the fuel injector.



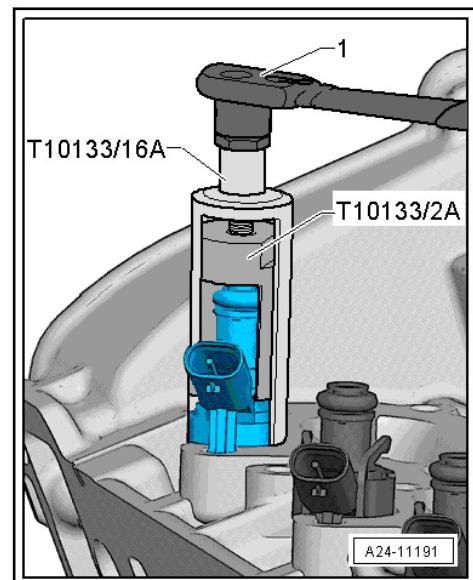
- Carefully hit the sleeve to loosen the fuel injector.



Note

Use a torque wrench to remove the fuel injector.

- Adjust to 5 Nm on the torque wrench
- Guide the -T10133/2A- in the groove on the fuel injector.



- Then install the removal tool -T10133/16A-.
- Remove the fuel injector by using the torque wrench -1- to turn the bolt.
- If the torque limit reaches »5 Nm« without loosening the fuel injector, remove the tool and use the boot to loosen the fuel injector.



i Note

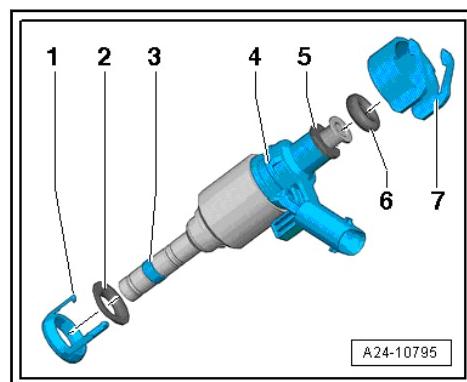
- ◆ *The fuel injectors may be damaged if the tightening specifications are not observed.*
- ◆ *The combustion chamber seal must always be replaced before reinstalling the fuel injector. Refer to [⇒ 12.4 njector Seals, Replacing](#), page 322 .*
- Replace combustion chamber seal and install fuel injector.
Refer to [⇒ 12.4 njector Seals, Replacing](#), page 322 .

2.4 Fuel Injector Seals, Replacing

i Note

The combustion chamber seal must always be replaced before reinstalling the fuel injector.

- Use a suitable tool to carefully remove the old combustion chamber seal -3-.

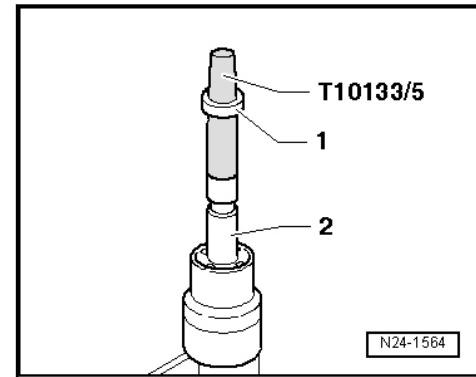


- For example, use a razor blade to cut off the seal or use a small screwdriver to widen the seal. Then remove the seal upward.
- When doing this, make sure not to damage the groove and circumferential ridge in the groove base.

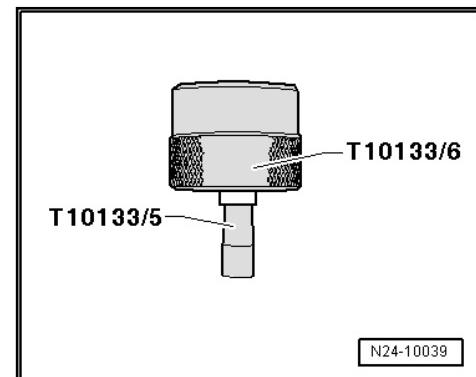
i Note

If the groove was damaged, the fuel injector must be replaced.

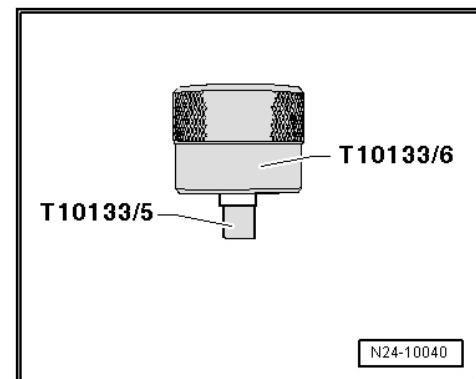
- Clean off the seal groove and the shaft of the fuel injector with a clean cloth before installing the new combustion chamber seal.
- Place the -T10133/5- with a new combustion chamber seal -1- onto the fuel injector -2-.



- Slide the combustion chamber seal with the -T10133/6- onto the -T10133/5- as far as possible.



- Rotate the -T10133/6- and slide the combustion chamber seal all the way onto the -T10133/5-.

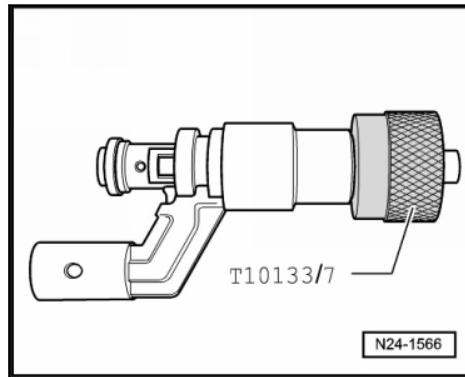


- Remove the -T10133/5- and slide the combustion chamber seal with the -T10133/6- all the way up to the seal groove.
- Press the -T10133/7- with a gentle turning movement (approximately 180°) all the way onto the fuel injector.

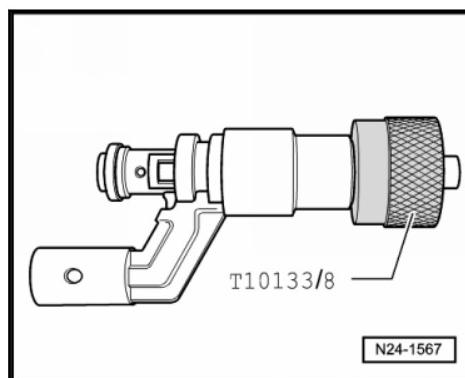


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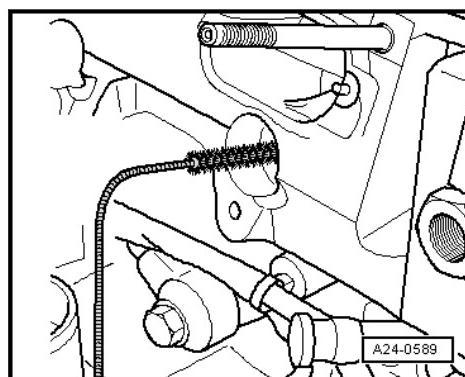
4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021



- Pull off the -T10133/7- again using turning motion in opposite direction.
- Press the -T10133/8- with a gentle turning movement (approximately 180°) all the way onto the fuel injector.



- Pull off -T10133/8- again using turning motion in opposite direction.
- Replace the O-ring on the fuel injector. Lightly coat the O-ring with clean engine oil before installing.
- Use the included -T10133/4- to thoroughly clean the high-pressure fuel injector bores in the cylinder head before installing the fuel injectors.

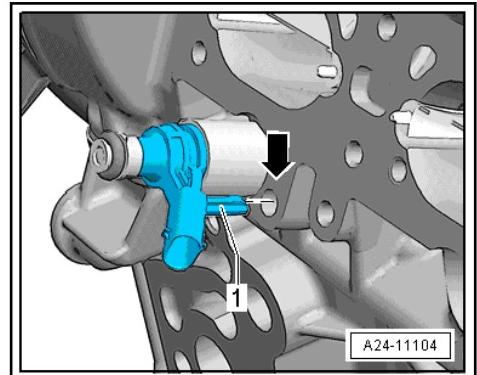


Note

- ◆ *Do not oil or grease the combustion chamber sealing ring on the fuel injector.*
- ◆ *When installing the injector valve, make sure there is no cleaning product or oil in the holes in the cylinder head.*

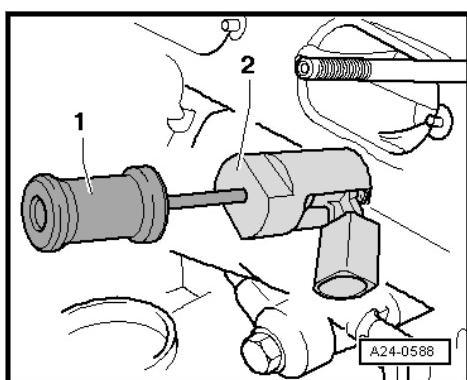


- Press fuel injector by hand into cylinder head (free of oil and grease) as far as stop. Make sure the fuel injectors are positioned correctly inside the cylinder head.
- The tab -1- and the opening -arrow- must be on top of each other in the cylinder head.



Note

- ◆ *The fuel injector must not be difficult to install. If necessary, wait as the combustion chamber seal continues to pull itself together.*
- ◆ *Make sure the fuel injectors are installed securely in the cylinder head.*
- ◆ *If it is difficult to install the fuel injector by hand, use the -T10133/2A- -2- with the -T10133/3- to guide in the fuel injector.*



- For easier installation into the fuel rail, coat the direct injection O-rings with clean engine oil.
- Install the fuel rail. Refer to [⇒ R2.2 ail, Removing and Installing](#), page 318 .
- Install the intake manifold. Refer to [⇒ M4.2 anifold, Removing and Installing](#), page 333 .

2.5 Fuel Injectors, Cleaning

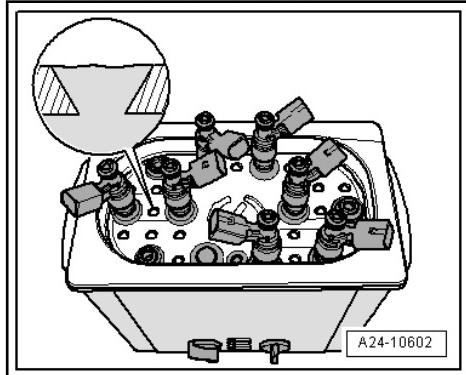
Special tools and workshop equipment required

- ◆ Ultrasonic Cleaning Unit -VAS6418-
- ◆ Mounting Plate for Injection Modules -VAS6418/1-
- ◆ Cleaning fluid. Refer to the Parts Catalog.



Note

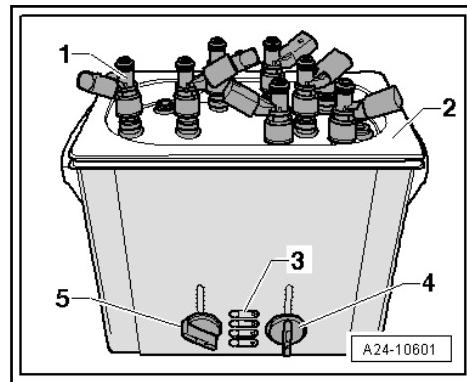
Fill the ultrasonic device up to the upper edge of the holes with cleaner (see the magnified area of the illustration).



Observe the safety precautions and the operating instructions for the ultrasonic device.

Cleaning

- Remove the fuel injectors. Refer to [⇒ I2.3 Injectors, Removing and Installing](#), page 319 .
- The ultrasonic device must be filled with cleaning fluid.
- Install the fuel injectors -1- until the stop in the -VAS6418/1-
-2-.
- Dip the fuel injectors into the cleaner with the -VAS6418/1-.



- Set the temperature control -4- to 50 °C (122 °F).
- Set the time control -5- to 30 minutes.
- Turn on the ultrasonic device -3-.

Note

The time begins counting down once the cleaning temperature reaches 50 °C (122 °F).

- Replace the combustion chamber seal (Teflon® seal) after cleaning each fuel injector. Refer to [⇒ I2.4 Injector Seals, Replacing](#), page 322 .
- Then reinstall the fuel injectors. Refer to [⇒ I2.3 Injectors, Removing and Installing](#), page 319 .



3 Air Filter

[⇒ -3.1 Air Filter Housing", page 327](#)

[⇒ F3.2 Filter Housing, Removing and Installing", page 329](#)

3.1 Overview - Air Filter Housing



Note

Air Filter, Removing And Installing. Refer to [⇒ F3.2 Filter Housing, Removing and Installing", page 329](#).



1 - Bolts

- 1.5 Nm
- For the air filter housing upper section

2 - Air Filter Housing Upper Section

- Clean the air filter housing upper section of salt residue, dirt and leaves

3 - Filter Element

- Always use an Original air filter. Refer to Parts Catalog.
- Note the replacement intervals. Refer to → Maintenance; Booklet 20.2 "Maintenance Tables".

4 - Snow Screen

- Not installed on all vehicles

5 - Air Filter Housing Lower Section

- Bolt, 8 Nm
- Clean the air filter housing lower section of salt residue, dirt and leaves
- Air filter housing mounting - lower section to body

6 - Rubber Buffer

7 - Water Drain Hose

- Clean the water drain hose

8 - Air Duct

- Bolted to the lock carrier

9 - Bolts

- 3 Nm

10 - Intake Air Duct

- From the air duct on the lock carrier
- Clean the intake air duct of dirt and leaves

11 - Intake Air Duct

12 - Spring Clamp

13 - Spring Clamp

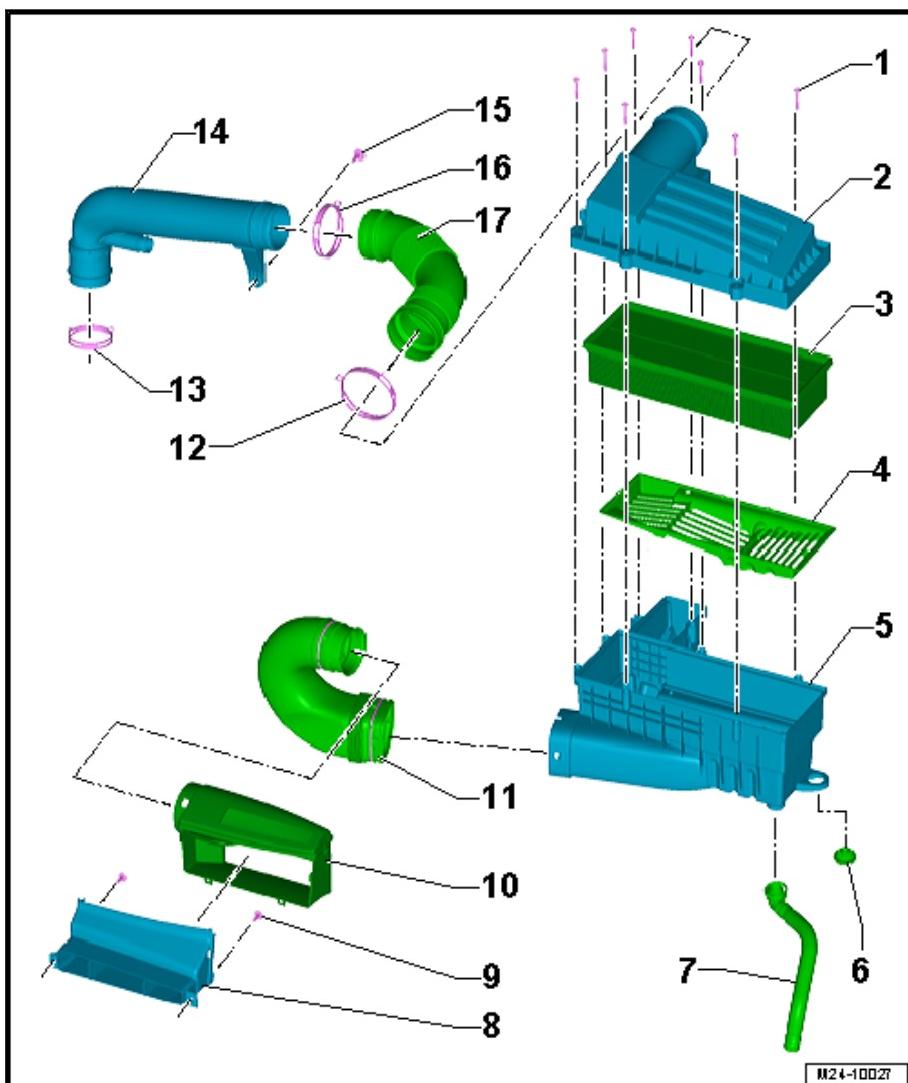
14 - Connecting Pipe

- From the air filter housing to the turbocharger

15 - Bolt

- 5 Nm
- Connecting tube to heat shield

16 - Spring Clamp





17 - Air Duct Hose

- To the turbocharger
- Make sure it is secure
- Check for dirt

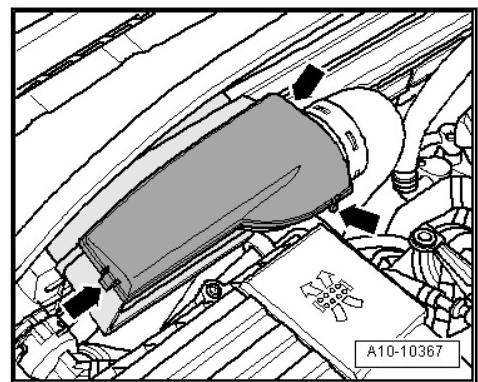
3.2 Air Filter Housing, Removing and Installing

Special tools and workshop equipment required

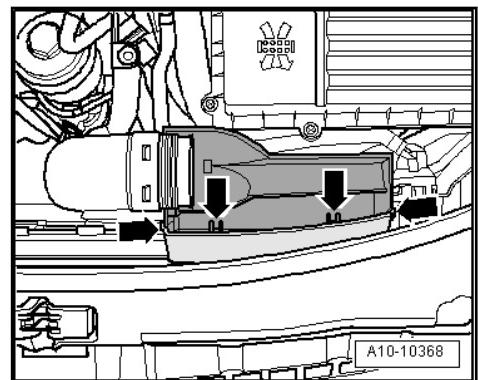
- ◆ Torque Wrench 1783 - 2-10Nm -VAG1783-
- ◆ Spring Clip Pliers

Removing

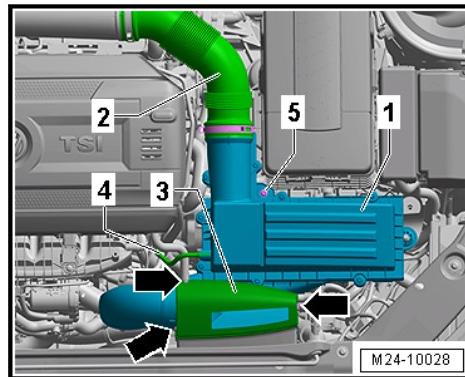
- Disengage the side clips -arrows- and remove the cover for the air duct.



- Disengage the wire retainers -arrows- to unclip the lower air duct.



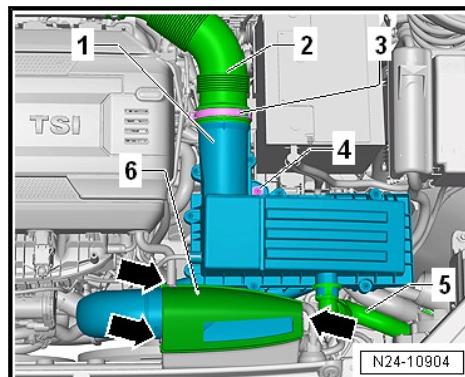
- Remove the air duct hose -2-.



- Remove vacuum line -4- from the air filter housing.
- Loosen the bolt -5- and remove the air filter housing -1- upward from the attachment bearing.

Vehicles with Secondary Air System

- Remove the secondary air line connection -5- from the air filter housing.



Continuation for All Vehicles

- Remove the air filter housing -1- upward together with the intake tube.

Installing

Install in reverse order of removal. Note the following:

- ◆ The hose connections and the hoses must be free of oil and grease before being installed. Use silicone-free lubricant when installing.
- ◆ Only use approved clamps for hose connections. Refer to the Parts Catalog.

Tightening Specifications

- ◆ Refer to [-3.1 Air Filter Housing](#), page 327



4 Intake Manifold

[**⇒ 4.1 Intake Manifold", page 331**](#)

[**⇒ M4.2 anifold, Removing and Installing", page 333**](#)

[**⇒ T4.3 hrottle Valve Control Module GX3, Removing and Instal-**](#)

[**ling", page 338**](#)

[**⇒ T4.4 hrottle Valve Control Module GX3, Cleaning", page 339**](#)

4.1 Overview - Intake Manifold

1 - Intake Manifold

- ❑ Removing and installing. Refer to M4.2 anifold, Removing and Installing “page 333”.

2 - Intake Manifold Runner Position Sensor -G336-

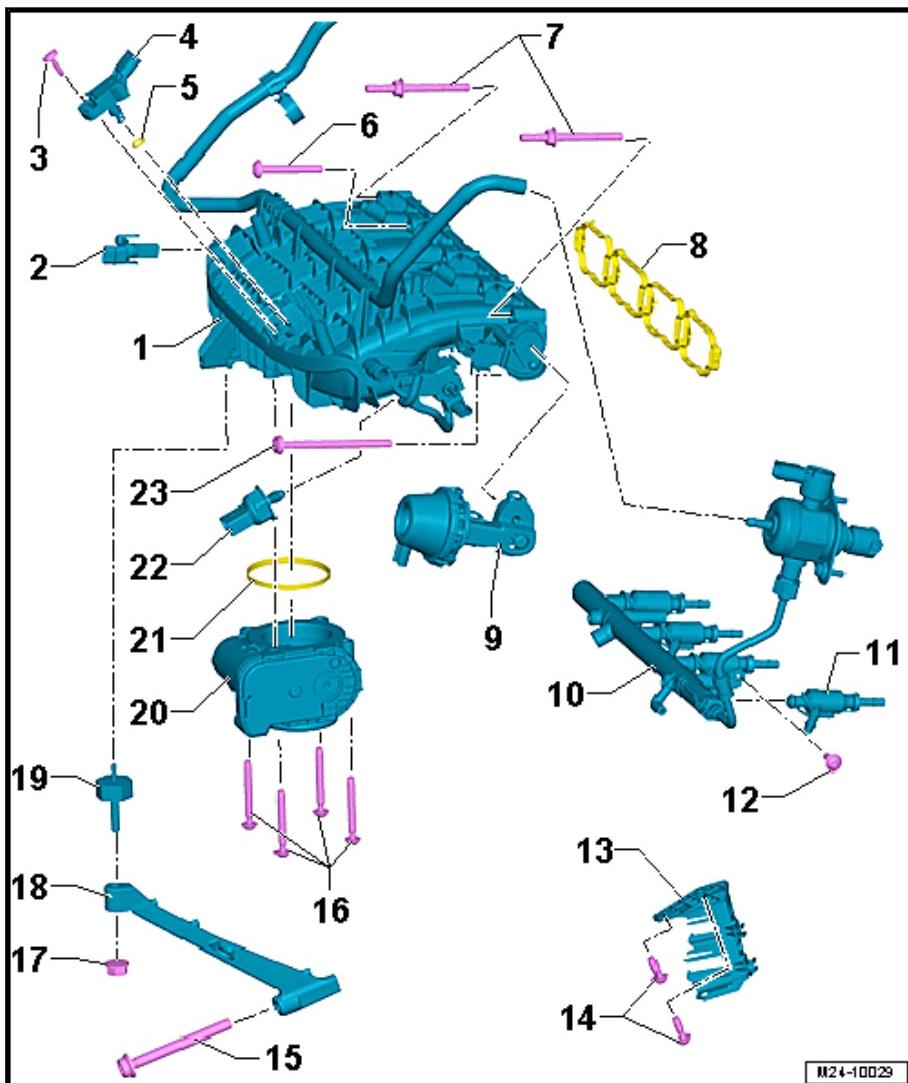
- ❑ The Intake Manifold Runner Position Sensor -G336- needs to be adapted to the Engine Control Module -J623- each time the sensor is removed and installed or replaced. See "Guided Functions". Refer to Vehicle Diagnostic Tester.

3 - Bolt

- 5 Nm
 - Intake Air Temperature Sensor -G42-

4 - Intake Manifold Sensor - GX9-

- 5 Nm
 - Consists of Intake Air Temperature Sensor - G42- and Manifold Absolute Pressure Sensor -G71-
 - Removing and installing. Refer to I5.5 Intake Manifold Sensor GX9, Removing and Installing", page 349.



5 - O-ring

- ❑ Replace after removing

6 - Bolt for the Intake Manifold

- 9 Nm

7 - Threaded Pin for Outer Intake Manifold

- 9 Nm
 - Installed on the outer positions as a guide

8 - Seal

- ❑ Check and replace if damaged

9 - Channel Separating Plate Vacuum Diaphragm (Intake Manifold Flaps)

10 - Fuel Injector Fuel Rail

11 - Fuel Injectors

- Replace the O-ring and Teflon® ring
 - Make sure it is installed in the correct position.
 - Removing and installing. Refer to **⇒ I2.3 Injectors, Removing and Installing**, page 319 .

12 - Bolt

- 9 Nm



- High pressure line to intake manifold

13 - Bracket

- Connectors

14 - Bolt

- 5 Nm

15 - Bolt

- 20 Nm
- For the intake manifold bracket

16 - Bolts for the Throttle Valve Control Module -GX3-

- 7 Nm

17 - Nut for the Intake Manifold Support

- 10 Nm

18 - Intake Manifold Support

19 - Rubber Bushing

- 5 Nm

20 - Throttle Valve Control Module -GX3-, EPC Throttle Drive -G186-

- EPC Throttle Drive Angle Sensor 1 -G187- and EPC Throttle Drive Angle Sensor 2 -G188-
- The Throttle Valve Control Module -J338- must be adapted to the Engine Control Module -J623- when it is removed, installed or replaced. See "Guided Functions"; to do so, use Vehicle Diagnostic Tester

21 - Seal

- Replace after removing

22 - Fuel Pressure Sensor -G247-

- Refer to [F5.3 uel Pressure Sensor G247, Removing and Installing](#), page 344
- Coat the sealing point and thread with clean engine oil.
- Item 23- [Item 23 \(page 318\)](#)

23 - Bolts

- 9 Nm
- Fuel rail to cylinder head

4.2 Intake Manifold, Removing and Installation

Special tools and workshop equipment required

- ◆ Elbow Assembly Tool -T10118-
- ◆ Hose Clip Pliers -VAS6362-

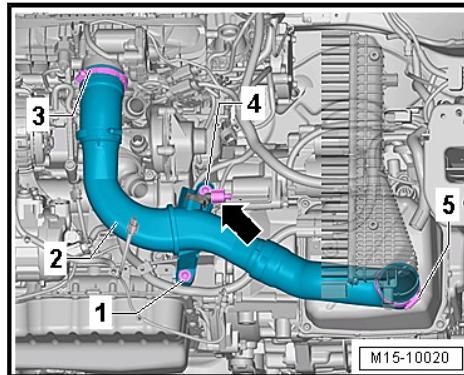
If the intake manifold is removed or replaced, the Intake Manifold Runner Position Sensor -G336- must be adapted to the Engine Control Module -J623-.

Removing

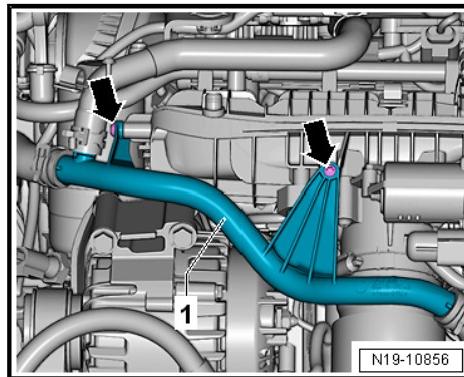
- Disconnect the battery at the negative terminal. Refer to [⇒ Electrical Equipment; Rep. Gr. 27; Battery; Battery, Disconnecting and Connecting](#).
- Remove the engine cover. Refer to [C3.1 over, Removing and Installing](#), page 40 .
- Remove the air filter housing -3-. Refer to [F3.2 ilter Housing, Removing and Installing](#), page 329 .
- Remove the fan shroud. Refer to [S4.5 hroud, Removing and Installing](#), page 273 .



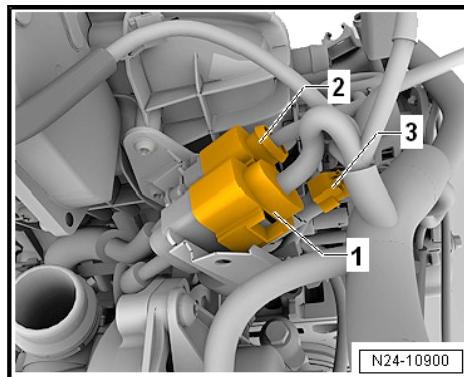
- Loosen the hose clamp -3 and 5-.



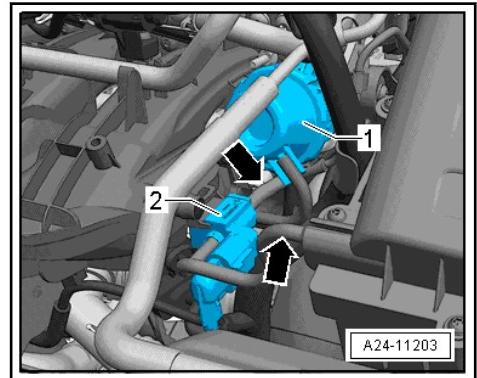
- Disconnect the connector from the Charge Air Pressure Sensor -G31- -arrow-.
- Remove the bolts -1 and 4- and then remove the air duct pipe downward.
- Remove the bolts -arrows- for the coolant line from the intake manifold.



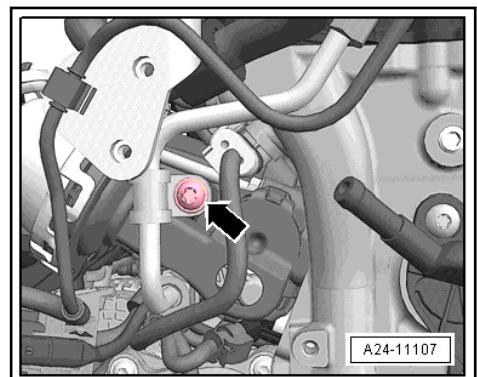
- Disconnect the connectors -1, 2 and 3- underneath the intake manifold.



- Disconnect the connector from the Intake Manifold Runner Control Valve -N316- -2-.



- Disconnect the vacuum line -back arrow- from the Intake Manifold Runner Control Valve - N316- -2-.
- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Remove the mount clamps -arrow- for the high pressure line.



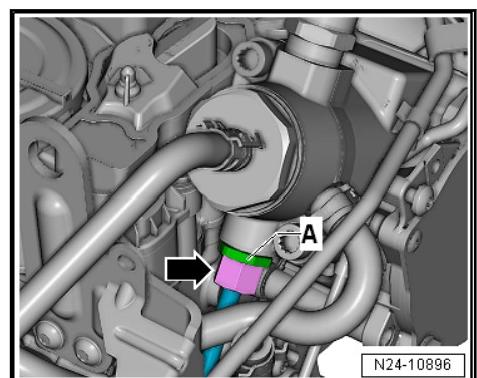
Caution

The fuel system is under pressure.

Risk of injury from fuel spraying out.

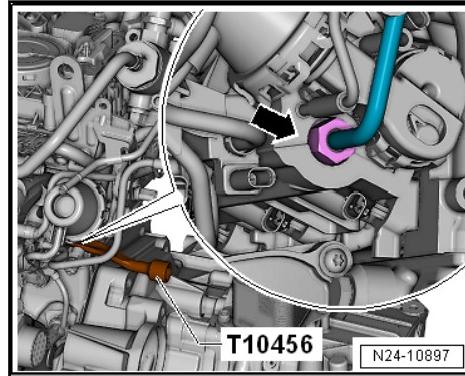
- *Wear protective eyewear.*
- *Wear safety gloves.*
- *Reduce the pressure: place clean cloths around the connection point and carefully open the connection point.*

- Counterhold the connection -A- and loosen the union nut -arrow-.



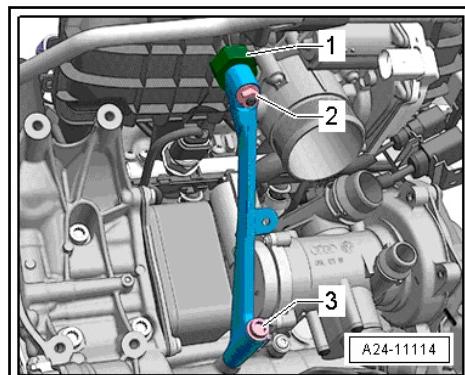


- Loosen the union nut on the fuel rail with the -T10456- and remove the high pressure line.

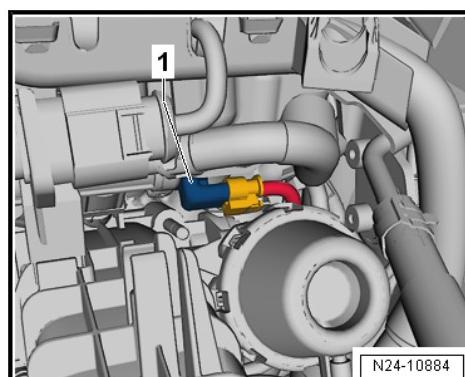


Note

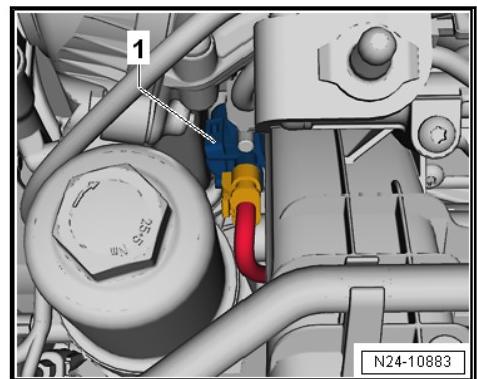
- ◆ Wipe up any leaking fuel with a cleaning cloth.
- ◆ Close the open connections with clean caps. Make sure that no dirt enters the fuel system.
- Remove the nut -2- and bolt -3- and then remove the intake manifold support.



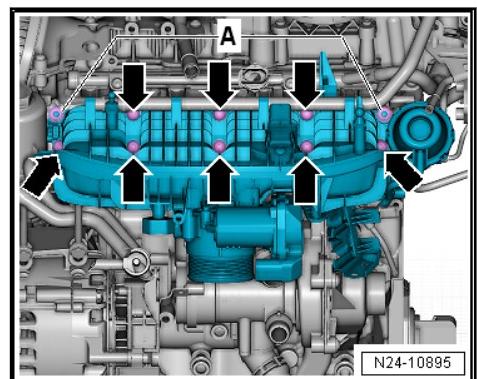
- Remove the rubber bushing -1- for the intake manifold support.
- Disconnect the connector -1- from the Camshaft Position Sensor -G40-.



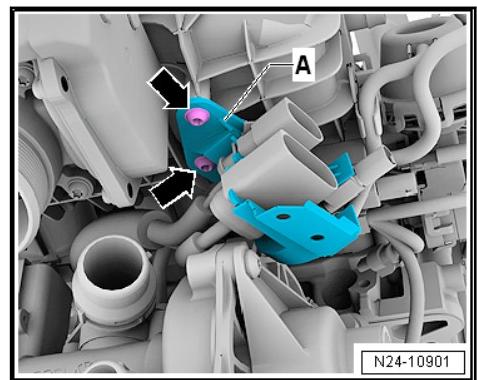
- Disconnect the connector -1- from the Intake Manifold Runner Position Sensor -G336-.



- Remove the nuts -A- and bolts -arrows- from the intake manifold.



- Pull the intake manifold slightly away from the cylinder head and remove the bolts -arrows- for the bracket -A-.



- Unclip the vacuum line from the intake manifold and remove the intake manifold.

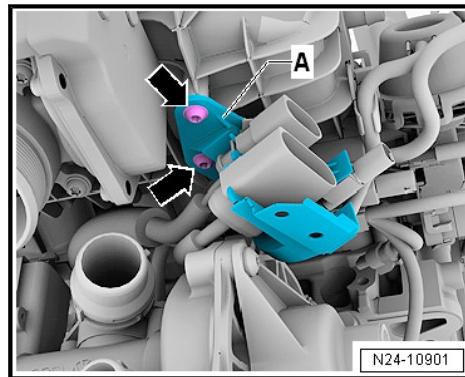


Note

Cover the intake channels with a clean cloth.

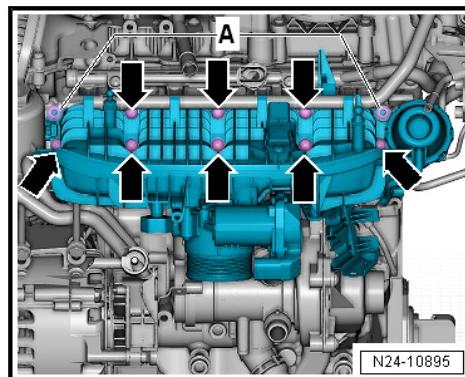
Installing

- If the connections on the high pressure pump were loosened, replace the connections.
- Position the intake manifold on the cylinder head and tighten the connector bracket -A-.



N24-10901

- Tighten the nuts -A- hand-tight.
- Tighten the bolts -arrows- evenly, working from the inside to the outside. Use the -T10347-.
- Install in reverse order of removal.



N24-10895

Tightening Specifications

- ◆ Refer to [⇒ 4.1 Intake Manifold", page 331](#)

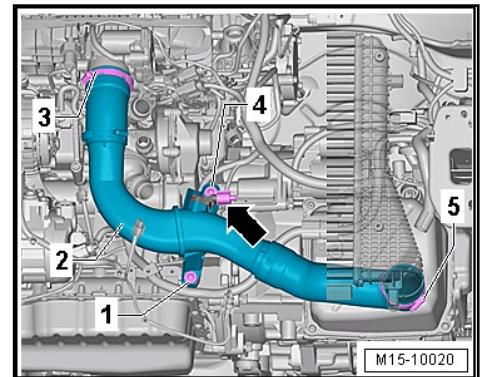
4.3 Throttle Valve Control Module -GX3-, Removing and Installing

The Throttle Valve Control Module -GX3- is comprised of:

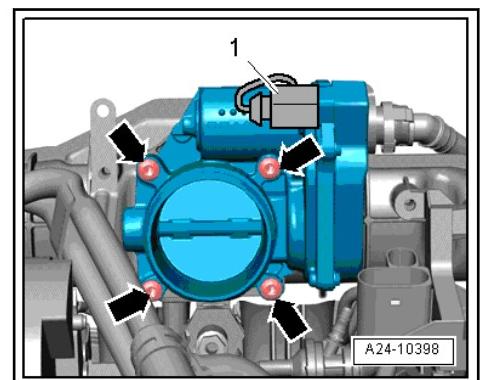
- ◆ EPC Throttle Drive -G186-
- ◆ EPC Throttle Drive Angle Sensor 1 -G187-
- ◆ EPC Throttle Drive Angle Sensor 2 -G188-

Removing

- Remove the engine cover. Refer to [⇒ C3.1 over, Removing and Installing", page 40](#).
- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Loosen the hose clamp -3 and 5-.



- Disconnect the connector from the Charge Air Pressure Sensor -G31- -arrow-.
- Remove the bolts -1 and 4- and then remove the air duct pipe downward.
- Disconnect the connector -1- from the Throttle Valve Control Module -GX3-.
- Remove the bolts -arrows- for the Throttle Valve Control Module -GX3- from below and remove the Throttle Valve Control Module -GX3-.



Installing

- Install in reverse order of removal.
- Clean the gasket sealing surface.
- Replace the seal.
- After replacing the Throttle Valve Control Module -GX3-, it must be adapted to the Engine Control Module -J623-.

Tightening Specifications

- ◆ Refer to [⇒ -4.1 Intake Manifold", page 331](#)

4.4 Throttle Valve Control Module -GX3-, Cleaning

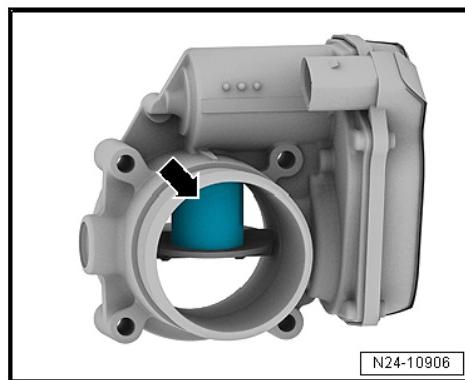
Special tools and workshop equipment required

- ◆ Acetone, commercially available
- ◆ Brush



Note

- ◆ If a new Engine Control Module -J623- is installed, then it must be adapted to the throttle valve control module.
 - ◆ Dirt and coking on the end stop can produce incorrect adaptation values.
 - ◆ The throttle valve connections must not be scratched when cleaning.
- Remove the Throttle Valve Control Module -GX3-. Refer to [⇒ T4.3 Throttle Valve Control Module GX3, Removing and Installing](#), page 338 .
- Open the throttle valve by hand and hold it in this position using a plastic or wood wedge -arrow-.



N24-10906

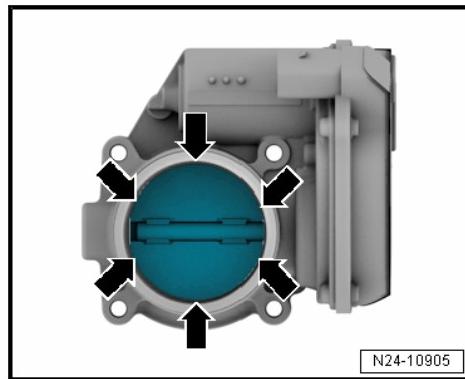


Caution

Risk of injury from acetone. Acetone is highly flammable and can cause eye and skin irritation.

- Wear protective eyewear.
- Wear safety gloves.

- Clean the throttle valve connection thoroughly with acetone and a brush especially in the area -arrows- near the closed throttle valve.



N24-10905

- Wipe the throttle valve connections with a lint-free cloth.
- Let the acetone dry completely.



- Install the Throttle Valve Control Module -GX3-. Refer to
⇒ [T4.3 hrottle Valve Control Module GX3, Removing and
Installing](#), page 338 .
- Erase the adaptation values and then adapt the Engine
Control Module -J623- to the Throttle Valve Control Module
-GX3-. To do this, use a Vehicle Diagnostic Tester.



5 Sensors

⇒ [-5.1 Structure Borne Sound Actuator and Control Module](#),
page 342

⇒ [S5.2 Structure-Borne Sound Control Module J869 and Structure-Borne Sound Actuator R214, Removing and Installing](#),
page 343

⇒ [F5.3 Fuel Pressure Sensor G247, Removing and Installing](#),
page 344

⇒ [F5.4 Fuel Pressure Sensor G247, Checking](#), page 346

⇒ [I5.5 Intake Manifold Sensor GX9, Removing and Installing](#),
page 349

5.1 Overview - Structure Borne Sound Actuator and Control Module

1 - Structure-Borne Sound Actuator -R214-

- Component location: inside the plenum chamber
- To remove and install, remove the plenum chamber cover. Refer to ⇒ Body Exterior; Rep. Gr. 50; Bulkhead; Plenum Chamber Cover, Removing and Installing.

2 - Bracket

- For the Structure-Borne Sound Actuator -R214-

3 - Bolt

- 8 Nm

4 - Nut

- 15 Nm

5 - Connector

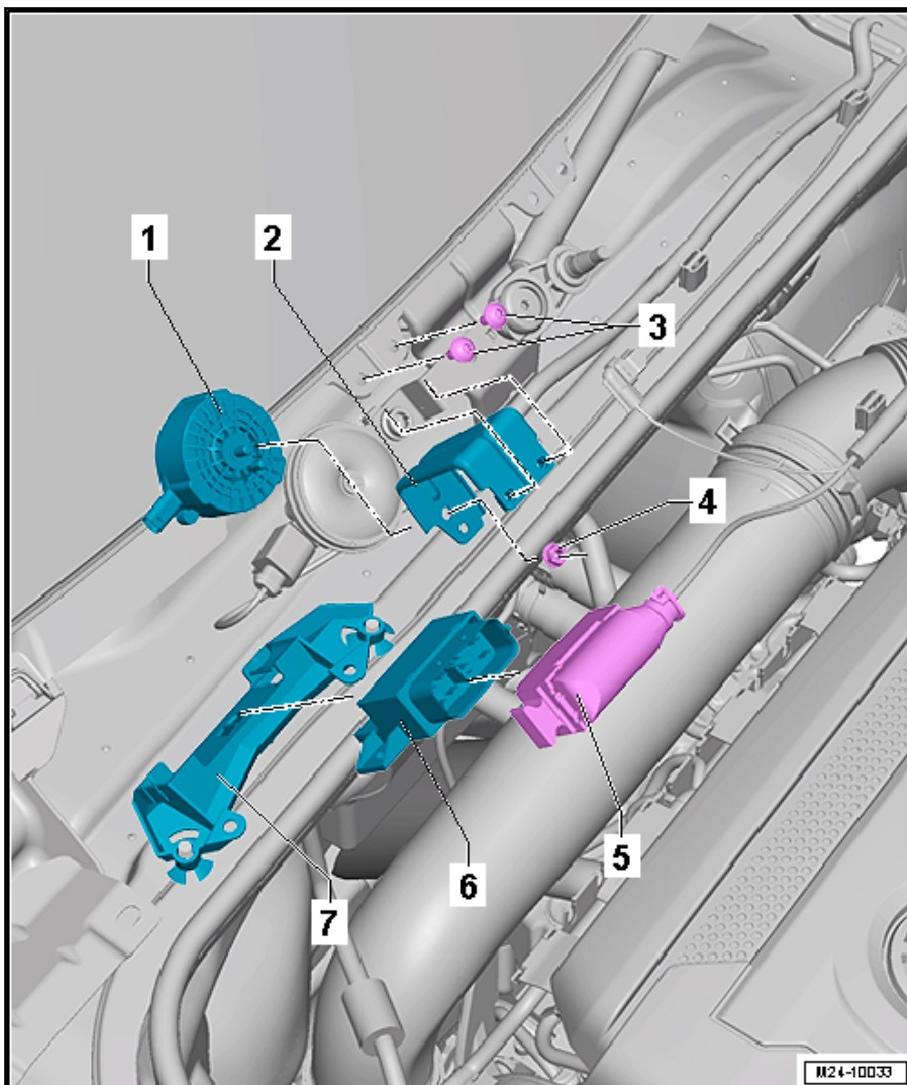
- Structure Borne Sound Control Module -J869-

6 - Structure Borne Sound Control Module -J869-

- Component location: inside the plenum chamber
- To remove and install, remove the plenum chamber cover. Refer to ⇒ Body Exterior; Rep. Gr. 50; Bulkhead; Plenum Chamber Cover, Removing and Installing.

7 - Bracket

- For the Structure Borne Sound Control Module -J869-





5.2 Structure-Borne Sound Control Module -J869- and Structure-Borne Sound Actuator -R214-, Removing and Installing

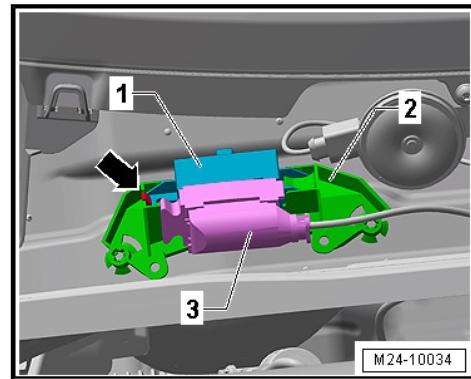
[⇒ S5.2.1 Structure Borne Sound Control Module J869, Removing and Installing", page 343](#)

[⇒ S5.2.2 Structure-Borne Sound Actuator R214, Removing and Installing", page 343](#)

5.2.1 Structure Borne Sound Control Module -J869-, Removing and Installing

Removing

- Remove the plenum chamber cover. Refer to ⇒ Body Exterior; Rep. Gr. 50; Bulkhead; Plenum Chamber Cover, Removing and Installing.
- Disconnect the connector -3-.



- Release the retainer -arrow-. Remove the Structure Borne Sound Control Module -J869- -1- from the bracket -2-.

Installing

Install in reverse order of removal.

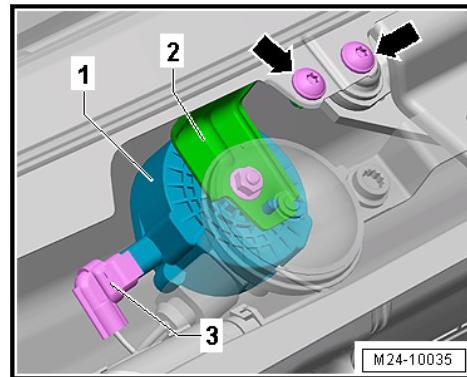
Tightening Specifications

- ◆ Refer to [⇒ -5.1 Structure Borne Sound Actuator and Control Module", page 342](#)

5.2.2 Structure-Borne Sound Actuator -R214-, Removing and Installing

Removing

- Remove the plenum chamber cover. Refer to ⇒ Body Exterior; Rep. Gr. 50; Bulkhead; Plenum Chamber Cover, Removing and Installing.
- Disconnect the connector -3-.



- Remove the bolts -arrows-.
- Remove the Structure-Borne Sound Actuator -R214- -1- with the bracket -2-.

Installing

Install in reverse order of removal.

Tightening Specifications

- ◆ Refer to [-5.1 Structure Borne Sound Actuator and Control Module](#), page 342

5.3 Fuel Pressure Sensor -G247-, Removing and Installing

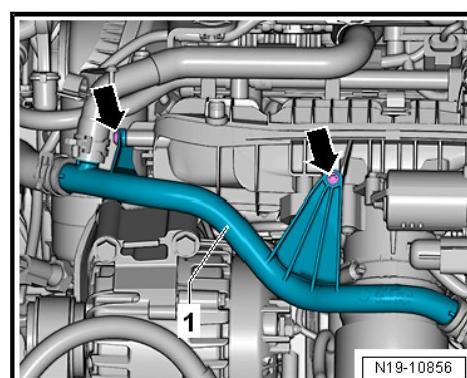
Special tools and workshop equipment required

- ◆ Elbow Assembly Tool -T10118-
- ◆ Socket - 27mm -T40218-

If the Fuel Pressure Sensor -G247- fails, the Fuel Pressure Regulator Valve -N276- will switch off, the electric fuel pump is fully activated and the engine will be driven by the existing fuel pressure. This will reduce the engine torque dramatically.

Removing

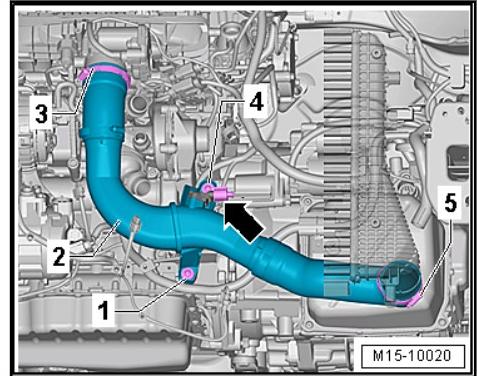
- Remove the engine cover. Refer to [C3.1 over, Removing and Installing](#), page 40 .
- Remove the bolts -arrows-.



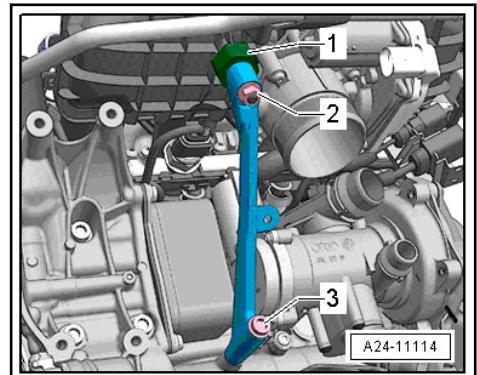
- Remove the air filter housing. Refer to [F3.2 filter Housing, Removing and Installing](#), page 329 .
- Loosen the hose clamp -3 and 5-.
- Disconnect the connector from the Charge Air Pressure Sensor -G31- -arrow-.



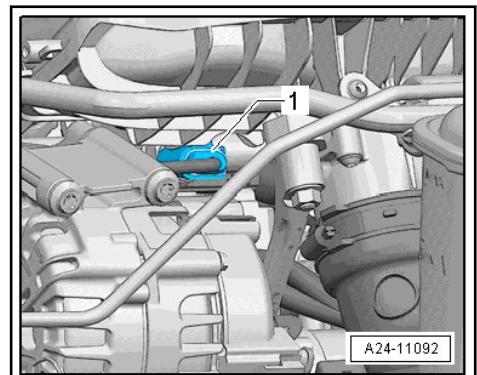
- Remove the bolts -1 and 4- and then remove the air duct pipe downward.



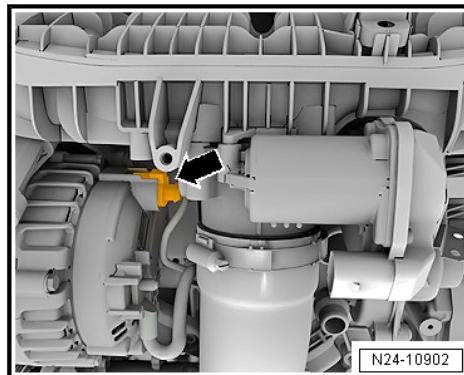
- Remove the nut -2- and bolt -3- and then remove the intake manifold support bracket.



- Remove the rubber bushing -1- for the intake manifold support bracket.
- Use the -T10118- -1- to release the connector from the Fuel Pressure Sensor -G247-.



- If necessary, remove the connector -arrow- from the generator, otherwise the socket can get hooked to the connector.



Continue for All



Caution

The fuel system is under pressure.

Risk of injury from fuel spraying out.

- *Wear protective eyewear.*
- *Wear safety gloves.*
- *Reduce the pressure: place clean cloths around the connection point and carefully open the connection point.*

- Loosen and remove the Fuel Pressure Sensor -G247- -1- using the -T40218-

Installing

- Coat the Fuel Pressure Sensor -G247- sealing point with clean engine oil.
- Install in reverse order of removal.

Tightening Specifications

- ◆ Refer to [⇒ -2.1 Fuel Rail with Fuel Injectors”, page 316](#)
- ◆ Refer to [⇒ -4.1 Intake Manifold”, page 331](#)

5.4 Fuel Pressure Sensor -G247-, Checking

Special tools and workshop equipment required

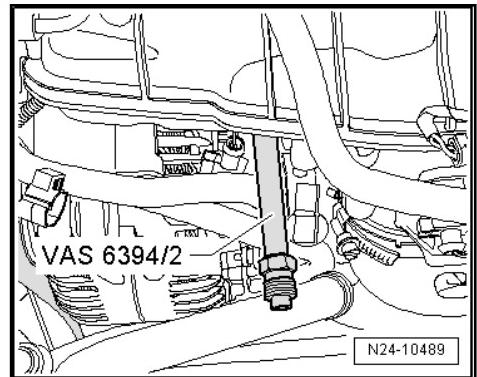
- ◆ Pressure Sensor Tester -VAS6394-
- ◆ Pressure Sensor Tester - Adapter 2 -VAS6394/2-
- ◆ Vehicle Diagnostic Tester - Test Adapter - 3 Pin -VAS5570-
- ◆ Torque Wrench 1331 5-50Nm -VAG1331-
- ◆ Vehicle Diagnostic Tester

Procedure:

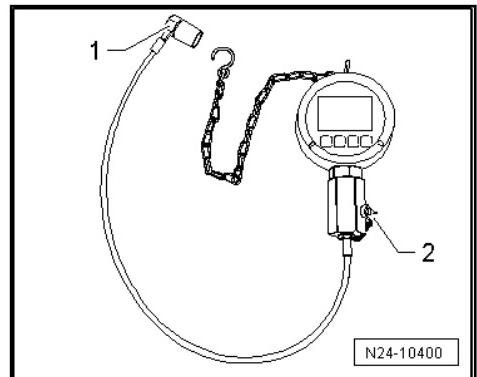
- Remove the engine cover. Refer to [⇒ C3.1 over, Removing and Installing”, page 40](#).
- Remove the Fuel Pressure Sensor -G247-. Refer to [⇒ F5.3 uel Pressure Sensor G247, Removing and Installing”, page 344](#).



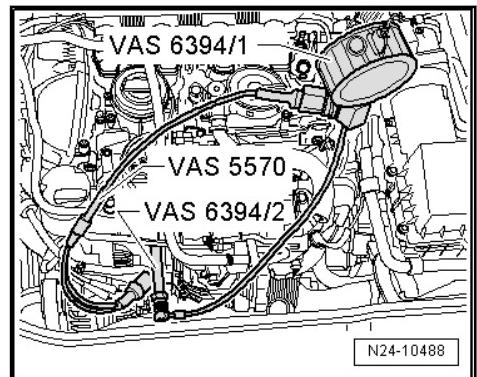
- Install the -VAS6394/2- instead of the Fuel Pressure Sensor -G247-. Fasten to the tightening specification for the Fuel Pressure Sensor -G247-.



- Open the sealing plug -2- of the -VAS6394/1-. Install the removed Fuel Pressure Sensor -G247- in the opening and tighten to the tightening specification.



- Use the -VAS5570- in order establish the electrical connection between the vehicle and the Fuel Pressure Sensor -G247-.



Note

For further work the engine must be started. For this reason the intake hose and air filter housing must be reinstalled.

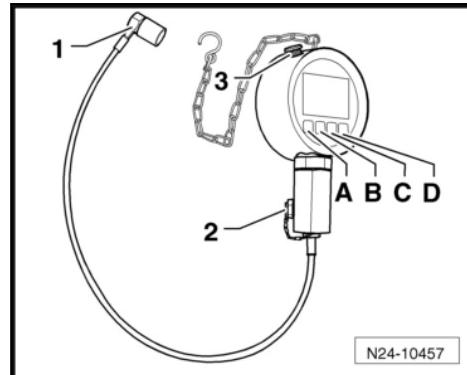
- Connect the Vehicle Diagnostic Tester.
- Switch the ignition on.
- Select “engine electronics” in OBD.
- Select “measured values”.



- Select "fuel pressure" from the list.

The current value is displayed in field, which the Fuel Pressure Sensor -G247- reports to the engine control module.

- Briefly press the button -A- once to turn on the -VAS6394/1-.

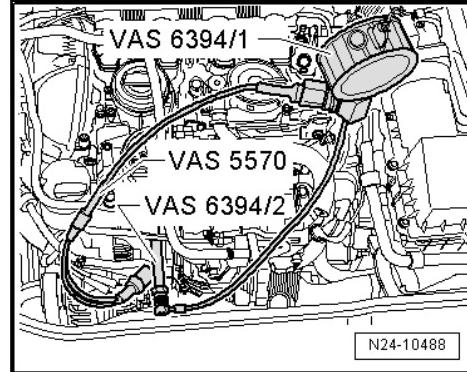


Note

Pressing the -A- button for two seconds causes it illuminate for 20 seconds.

The -VAS6394/1- must display 0 bar; if this is not the case, then press button -C- one time quickly to set it back to zero.

- Connect the pressure line on the -VAS6394/1- to the -VAS6394/2-.



- Start the engine.
- Compare the pressure shown in the -VAS6394/1- with the actual value in the Vehicle Diagnostic Tester.
- The pressures may have a maximum difference of 5 bar (72.5 psi).
- If the difference is greater than 5 bar (72.5 psi), test a new Fuel Pressure Sensor -G247-.
- Insert a new Fuel Pressure Sensor -G247- in the -VAS6394/1-.
- Repeat the test with the new Fuel Pressure Sensor -G247- and compare both values.

If the Measured Values Do Not Now Match Again:

- Check the wiring connectors between the Fuel Pressure Sensor -G247- and the engine control module. Refer to ⇒ Wiring diagrams, Troubleshooting & Component locations.



If the Measured Values Now Match:

- Install the new Fuel Pressure Sensor - G247-. Refer to [F5.3 Fuel Pressure Sensor G247, Removing and Installing](#), page 344 .

Tightening Specifications

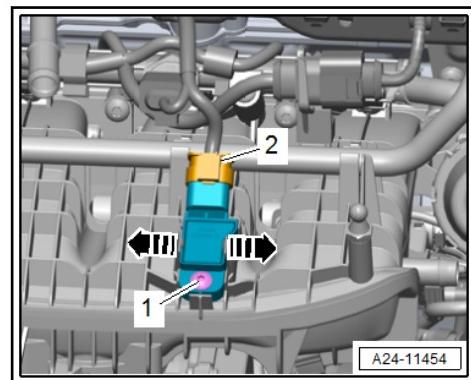
- ◆ Refer to [-2.1 Fuel Rail with Fuel Injectors](#), page 316

5.5 Intake Manifold Sensor -GX9-, Removing and Installing

The Intake Manifold Sensor -GX9- consists of the Intake Air Temperature Sensor -G42- and Manifold Absolute Pressure Sensor -G71-.

Removing

- Remove the engine cover. Refer to [C3.1 over, Removing and Installing](#), page 40 .
- Disconnect the connector -2-.



- Remove the bolt -1-.
- Release the catches in direction of -arrows- and remove the Intake Manifold Sensor -GX9- from the intake manifold.

Installing

Install in reverse order of removal.

Tightening Specifications

- ◆ Refer to [-4.1 Intake Manifold](#), page 331



6 Engine Control Module

⇒ [E6.1 engine Control Module J623, Removing and Installing”, page 350](#)

6.1 Engine Control Module -J623-, Removing and Installing

⇒ [E6.1.1 ngine Control Module J623, Removing and Installing, without Protective Housing”, page 350](#)

⇒ [E6.1.2 ngine Control Module J623 with Protective Housing, Removing and Installing”, page 351](#)

6.1.1 Engine Control Module -J623-, Removing and Installing, without Protective Housing

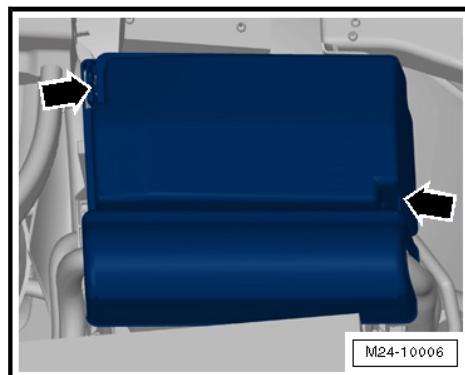


Note

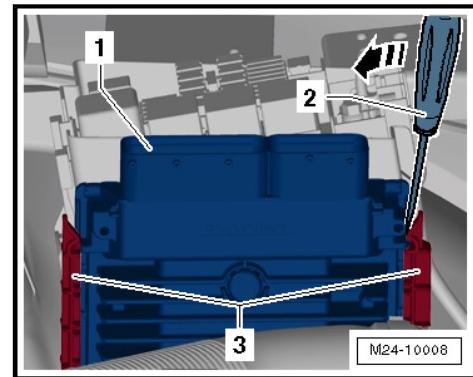
If it is necessary to replace the engine control module, connect the Vehicle Diagnostic Tester and perform “Replace control module” function.

Removing

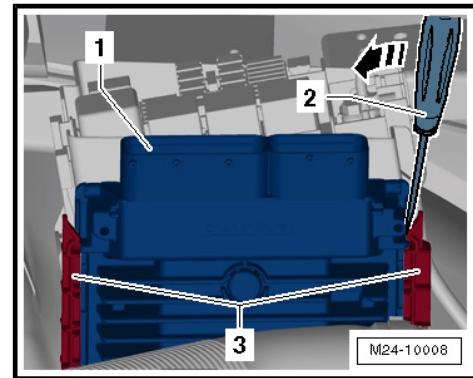
- Switch off the ignition.
- Remove the E-box cover inside the engine compartment -arrows-.



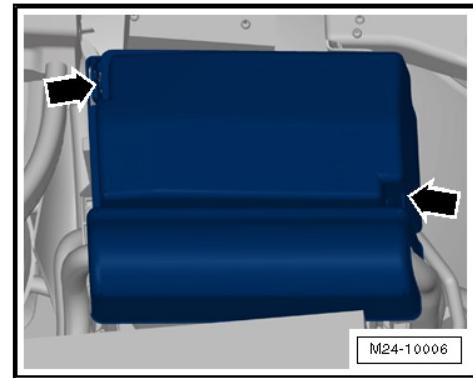
- Unlock and disconnect the connector from the engine control module.
- Push the tabs on the side guides -3- carefully toward the outside with a screwdriver -2-.
- Remove the engine control module -1- from the guides -3-.



Installing



- Install the engine control module -1- into the guides -3- until it locks.
- Connect the connector to the engine control module.
- Install the E-box cover -arrows-.



6.1.2 Engine Control Module -J623- with Protective Housing, Removing and Installing

Special tools and workshop equipment required

- ◆ Cutting grinder, such as the Axial Grinder -VAS6682-

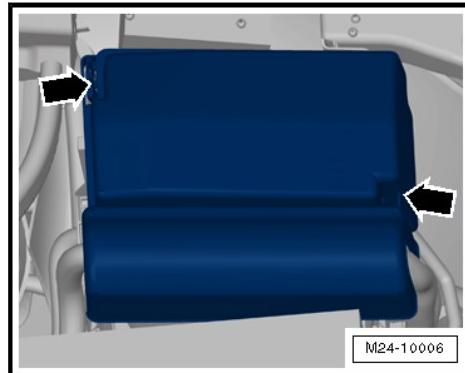


Note

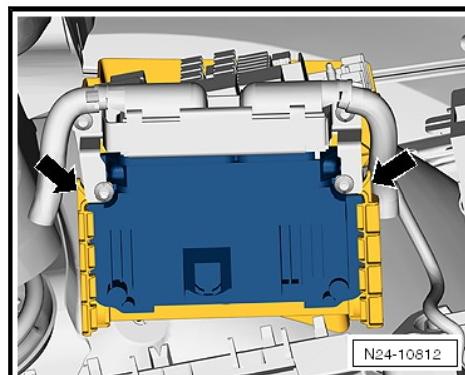
- ◆ If it is necessary to replace the engine control module, connect the Vehicle Diagnostic Tester and perform "Replace control module" function.
- ◆ Shear bolts attach the protective housing. It is not possible to remove the shear bolts without damaging them. Use -VAS6682- or a cutting grinder to remove the shear bolts. The protective housing must be replaced if it was damaged.

Removing

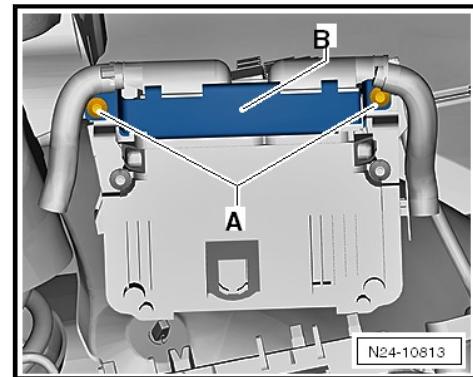
- Switch off the ignition.
- Remove the air filter housing. Refer to [⇒ F3.2 Filter Housing, Removing and Installing](#), page 329 .
- Remove the battery. Refer to ⇒ Electrical Equipment; Rep. Gr. 27; Battery; Battery, Removing and Installing.
- Remove the E-box cover inside the engine compartment
-arrows-.



- Free up the wiring harness and pull engine control module upward out of its mount. Push the locking mechanism -arrows- to the side.

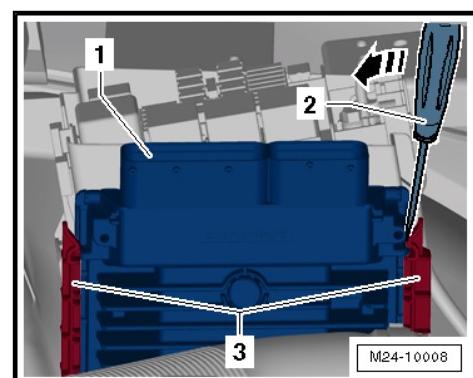


- Remove the bolts -A-. Push the wiring harness as far as possible to the side. Remove the locking mechanism -B-.
- Unlock the connector and pull it off the engine control module.

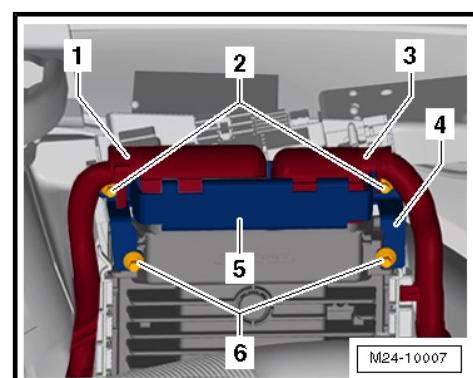


Installing

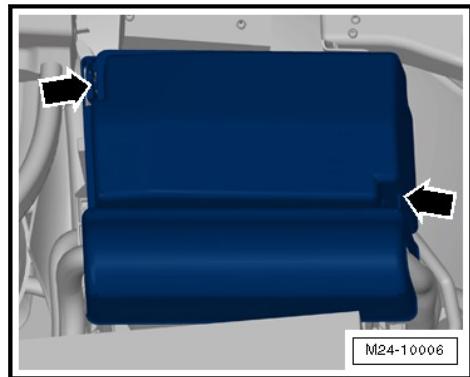
- Install the engine control module -1- into the guides -3- until it locks.



- If the control module was replaced, then attach the bracket -4- to the engine control module with shear bolts -6-.



- Tighten the shear bolts -6- just enough until the bolt head breaks off.
- Connect the connectors -1 and 3- to the engine control module.
- Install the locking mechanism -5- with shear bolts -2-.
- Tighten the shear bolts -2- until the bolt heads break off.
- Install the E-box cover -arrows-.



- Install the air filter housing. Refer to [⇒ F3.2 ilter Housing, Removing and Installing](#), page 329 .
- Install the battery. Refer to ⇒ Electrical Equipment; Rep. Gr. 27; Battery; Battery, Removing and Installing.



7 High Pressure Pump

[**⇒ -7.1 High Pressure Pump", page 355**](#)

[**⇒ P7.2 pressure Pump, Removing and Installing", page 357**](#)

7.1 Overview - High Pressure Pump



1 - Connector

- For Fuel Pressure Regulator Valve -N276-

2 - High Pressure Pump Bolt

- 8 Nm +90°
- Replace after removing
- Tighten hand-tight

3 - High Pressure Pump

- There is an electric fuel pump located in the fuel tank that supplies the fuel to the mechanical high pressure pump.
- Pay attention when installing the high pressure pump, that no dirt enters the fuel system.
- Install the fuel lines free of tension
- Inspect the O-ring, and replace if damaged
- With Fuel Pressure Regulator Valve -N276-
- Removing and Installing. Refer to [P7.2 re-pressure Pump, Removing and Installing](#), page 357 .

4 - O-ring

- Replace if damaged

5 - Roller Tappet

- Remains inserted in the vacuum pump after removing the high pressure pump

6 - High Pressure Pump Bolt

- Tighten hand-tight
- 8 Nm +90°
- Replace after removing

7 - Fuel Supply Line Connection

- 40 Nm
- Replace after removing
- When loosening the high pressure line, secure the connection from turning.

8 - High Pressure Line

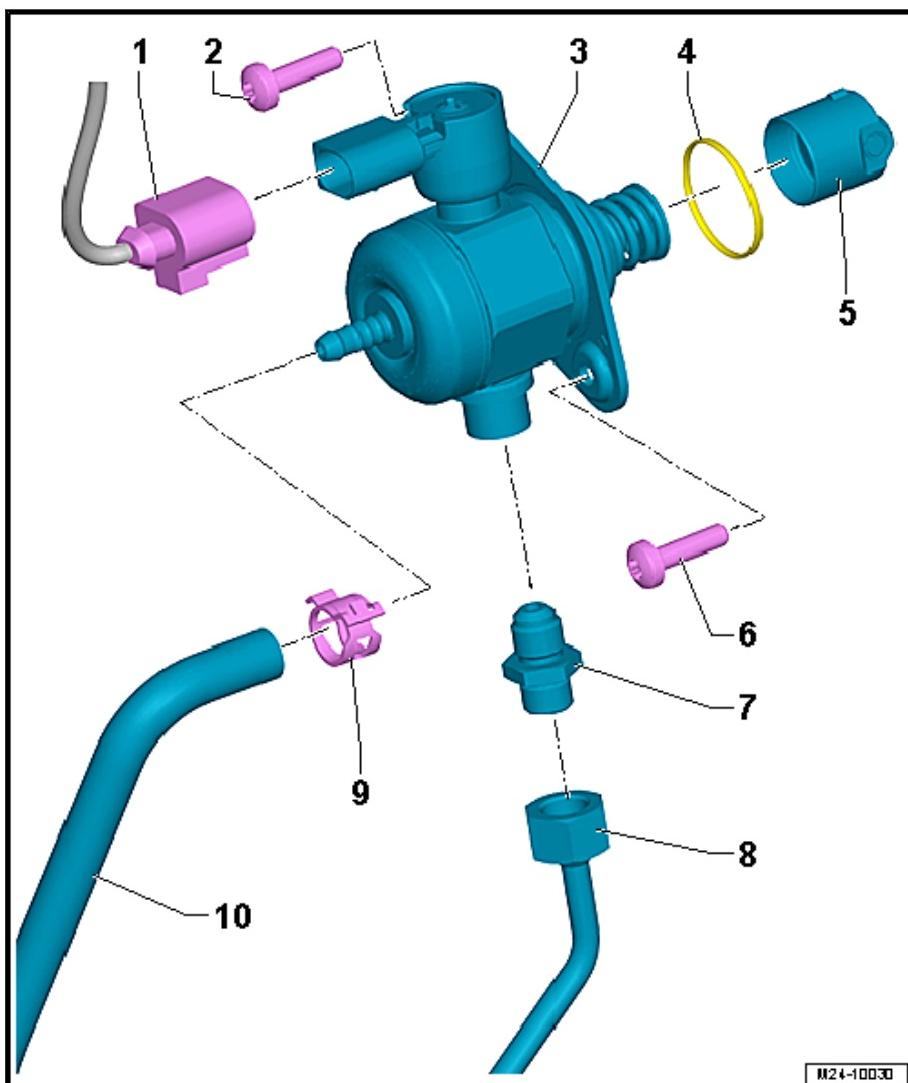
- 27 Nm
- For the fuel injector fuel rail
- Lubricate the fuel supply line ball with engine oil
- Install fuel supply line free of stress

9 - Spring Clamp

- Replace if damaged

10 - Fuel Supply Line

- Coming from the fuel tank





7.2 High Pressure Pump, Removing and Installing

Special tools and workshop equipment required

- ◆ Flare Nut Attachment - 17mm -T10456-
- ◆ Torque Wrench 1331 Insert - Open Jaw - 17mm - VAG1331/6-

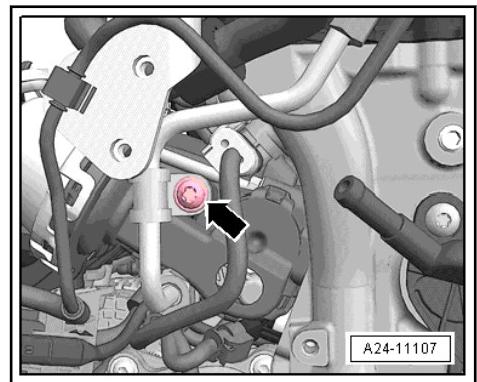


Note

- ◆ Only remove the high pressure pump when the engine is cold.
- ◆ When installing the high pressure pump, make sure that no dirt enters the fuel system.
- ◆ Collect escaping fuel with a cleaning cloth.
- ◆ Inspect the O-ring for the high pressure pump, and replace it if damaged.
- ◆ If the connection for the high pressure line -item 7- ([Item 7 \(page 356\)](#)) is loosened, it must be replaced.
- ◆ Lubricate the high pressure line with engine oil and always fasten them free of tension.
- ◆ Vehicles with the engine codes CNTA do not have an intake manifold-fuel injector.

Removing

- Remove the engine cover. Refer to [C3.1 over, Removing and Installing", page 40](#).
- Remove the air filter housing. Refer to [F3.2 ilter Housing, Removing and Installing", page 329](#).
- Remove mounting clamp -arrow- if present.





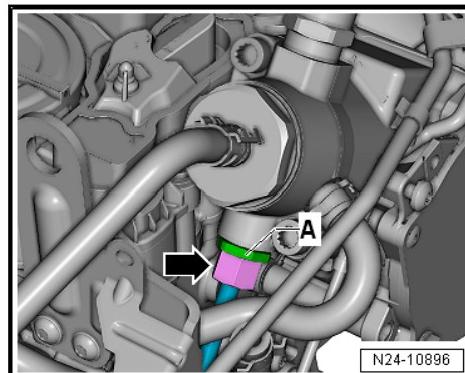
Caution

The fuel system is under pressure.

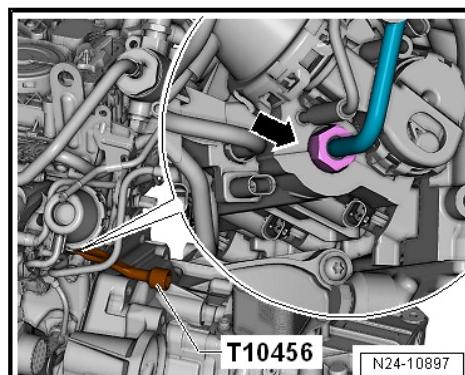
Risk of injury from fuel spraying out.

- **Wear protective eyewear.**
- **Wear safety gloves.**
- **Reduce the pressure: place clean cloths around the connection point and carefully open the connection point.**

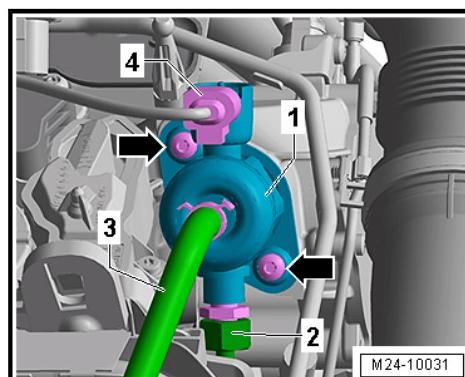
- Counterhold at the hex head -A- and loosen the union nut -arrow- from the high pressure pump. Remove the high pressure pipe.



- Loosen the union nut on the fuel rail with the -T10456- and remove the high pressure pipe.



- Disconnect the connector -4- from the Fuel Pressure Regulator Valve -N276-.



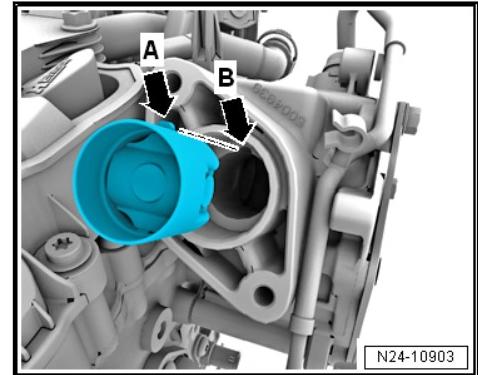
- Remove the fuel line -3- from the high pressure pump.



- Remove both bolts -arrows-.
- Carefully remove the high pressure pump -1-. The roller tappet can possibly remain in the vacuum pump.

Installing

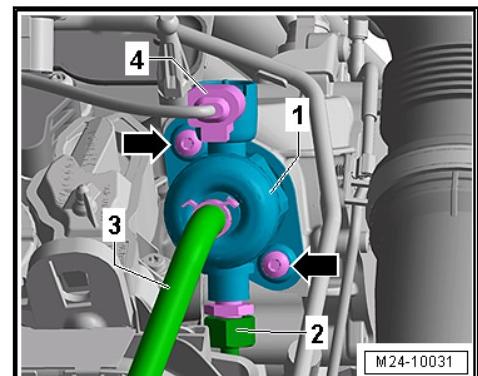
- Check the O-ring on the high pressure pump, and coat it lightly with clean engine oil.
- Inspect the roller tappet for damages before installing and replace if necessary.
- Insert the roller tappet into the vacuum pump as shown.



Note

- ◆ To insert the high pressure pump, the roller tappet must be at its lowest point.
- ◆ If the connection for the high pressure line -item 7- [⇒ Item 7 \(page 356\)](#) was loosened, it must be replaced.

- Rotate the crankshaft until the roller tappet is at the lowest point.
- Install the high pressure pump -1- into the vacuum pump and tighten it.
- Hand-tighten the bolts -arrows-.



- Tighten the bolt to the tightening specification.
- If necessary, replace the connection on the high pressure pump.
- Insert the fuel line -3- and secure it with a spring clamp.
- Reinstall the fuel supply line and fasten both union nuts two turns.



- Hand-tighten the union nut on the fuel supply line -2-. Align them without tension and tighten them to the tightening specification. Refer to [⇒ -7.1 High Pressure Pump”, page 355](#).
- Re-insert the connector -4- from the Fuel Pressure Regulator Valve -N276-.

 Note

Check the fuel system for leaks.

Tightening Specifications

- ◆ Refer to [⇒ -7.1 High Pressure Pump”, page 355](#)



8 Heated Oxygen Sensor

[⇒ 8.1 Heated Oxygen Sensor", page 361](#)

[⇒ O8.2 oxygen Sensor 1 before Catalytic Converter GX10, Removing and Installing", page 362](#)

[⇒ O8.3 oxygen Sensor 1 after Catalytic Converter GX7, Removing and Installing", page 363](#)

8.1 Overview - Heated Oxygen Sensor

1 - Connector

- For Oxygen Sensor 1 before Catalytic Converter -GX10-

2 - Oxygen Sensor 1 before Catalytic Converter -GX10-

- 55 Nm
- Consists of Heated Oxygen Sensor -G39- and Oxygen Sensor Heater -Z19-
- Removing and installing. Refer to ⇒ [O8.2 oxygen Sensor 1 before Catalytic Converter GX10, Removing and Installing", page 362](#).

3 - Bracket

- Coupling point for Oxygen Sensor 1 after Catalytic Converter -GX7-
- To underbody

4 - Oxygen Sensor 1 after Catalytic Converter -GX7-

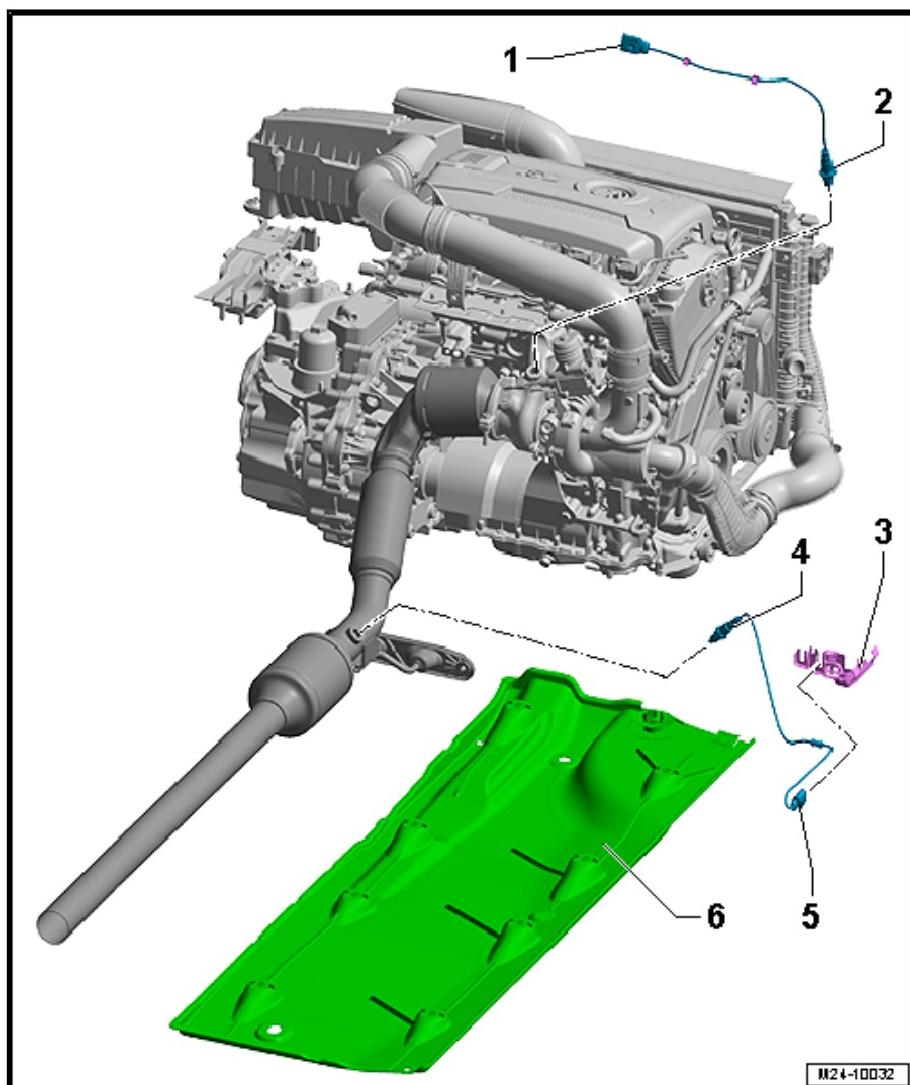
- 55 Nm
- Consists of Oxygen Sensor after Three Way Catalytic Converter -G130- and Heater for Oxygen Sensor 1 after Catalytic Converter -Z29-
- Removing and installing. Refer to ⇒ [O8.3 oxygen Sensor 1 after Catalytic Converter GX7, Removing and Installing", page 363](#).

5 - Connector

- For Oxygen Sensor 1 after Catalytic Converter -GX7-
- On the underbody

6 - Underbody Trim Panel

- Right
- Removing and installing. Refer to ⇒ Body Exterior; Rep. Gr. 66; Underbody Trim Panel; Underbody Panels, Removing and Installing



M24-10032



8.2 Oxygen Sensor 1 before Catalytic Converter -GX10-, Removing and Installing

Special tools and workshop equipment required

- ◆ Ring Wrench 7-Piece Set -3337-

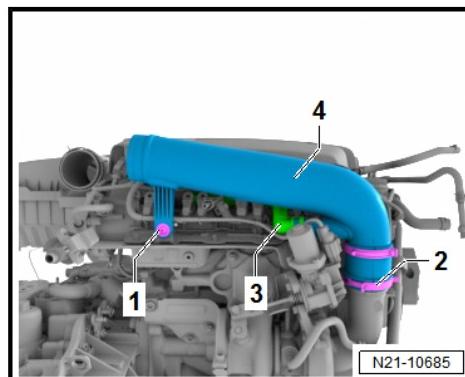
The Oxygen Sensor 1 before Catalytic Converter -GX10- is composed of:

- ◆ Heated Oxygen Sensor -G39-
- ◆ Oxygen Sensor Heater -Z19-

Removing

- Remove the engine cover. Refer to [⇒ C3.1 over, Removing and Installing", page 40](#).
- Remove the connecting tube from the air filter housing to the charge air pipe. Refer to [⇒ F3.2 filter Housing, Removing and Installing", page 329](#).

Item -3- with Two Different Versions

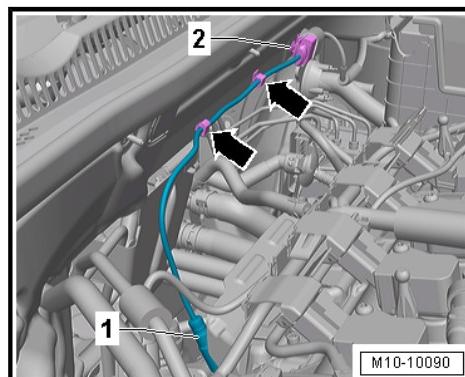


Item -3-, Version 1 with Two Locking Tabs

- push the locking mechanism on the crankcase ventilation hose -3- together and remove the hose.

Item -3-, Version 2 without Locking Tabs

- Lay the air guide pipe with the connected line -3- on the cylinder head.
- Disconnect the Oxygen Sensor 1 before Catalytic Converter - GX10- connector at the separating point -1-.
- Unclip the wire from the brackets -arrows- to free up the wire.
- Remove the Oxygen Sensor 1 before Catalytic Converter -GX10- -1- using a tool from the -3337-.





Installing

Note the following during installation:



- ◆ Coat new oxygen sensors with an assembly paste. This paste must not come into contact with oxygen sensor slots.
- ◆ For a used heated oxygen sensor, only coat the threads with hot bolt paste. This paste must not come into contact with oxygen sensor slots. Hot bolt paste. Refer to the Parts Catalog.
- ◆ The oxygen sensor wire must always be attached at the same location when installing. Do not the electrical wire connection come in contact with the exhaust pipe.

Tightening Specifications

- ◆ Refer to [⇒ -8.1 Heated Oxygen Sensor", page 361](#)

8.3 Oxygen Sensor 1 after Catalytic Converter -GX7-, Removing and Installing

Special tools and workshop equipment required

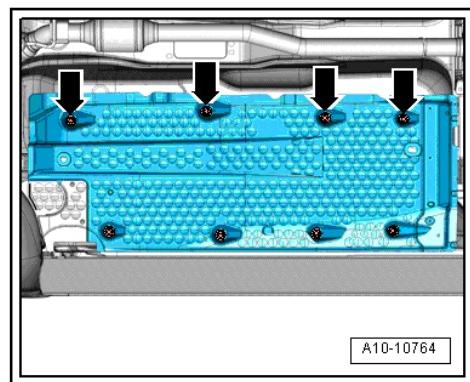
- ◆ Ring Wrench 7-Piece Set -3337-

The Oxygen Sensor 1 after Catalytic Converter -GX7- is composed of:

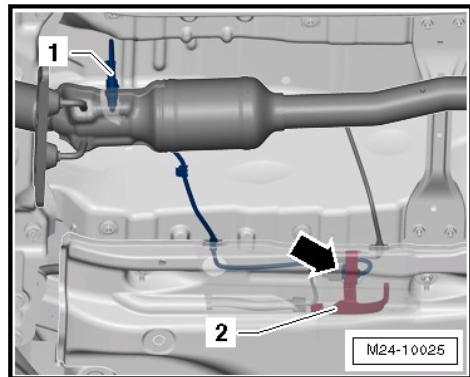
- ◆ Oxygen Sensor after Three Way Catalytic Converter -G130-
- ◆ Heater For Oxygen Sensor 2 after Catalytic Converter -Z30-

Removing

- Remove the nuts -arrows- from the right underbody panel and pull the underbody panel slightly downward.



- Unclip the connector -arrow- from the bracket -2- and disconnect it.
- Remove the Oxygen Sensor 1 after Catalytic Converter -GX7- -1- using a tool from the -3337-.



Installing

Install in reverse order of removal and note the following:



Note

- ◆ Coat new oxygen sensors with an assembly paste. This paste must not come into contact with oxygen sensor slots.
- ◆ For a used heated oxygen sensor, only coat the threads with hot bolt paste. This paste must not come into contact with oxygen sensor slots. Hot bolt paste. Refer to the Parts Catalog.
- ◆ The oxygen sensor wire must always be attached at the same location when installing. Do not let the electrical wire connection come in contact with the exhaust pipe.

Tightening Specifications

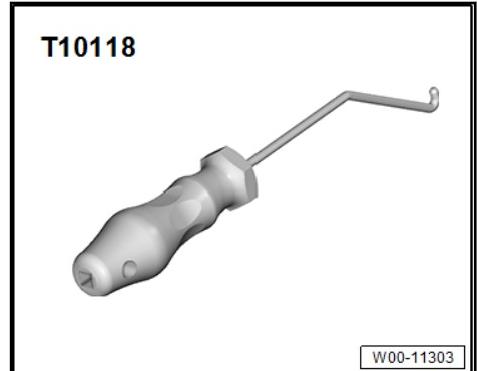
- ◆ Refer to [-8.1 Heated Oxygen Sensor](#), page 361



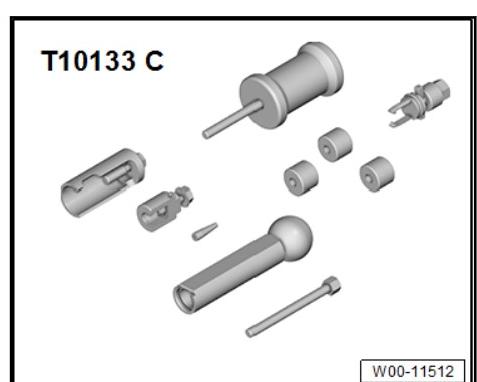
9 Special Tools

Special tools and workshop equipment required

- ◆ Elbow Assembly Tool -T10118-



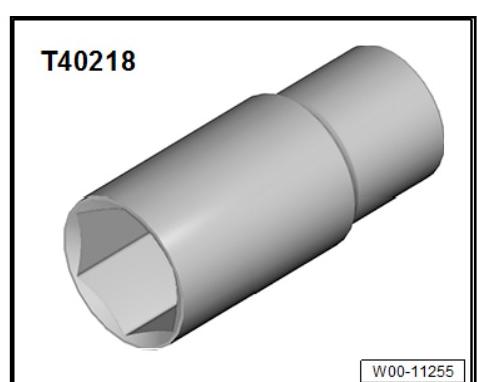
- ◆ Injector/Combustion Chamber Seal Tool Set -T10133C-



- ◆ Flare Nut Attachment - 17mm -T10456-

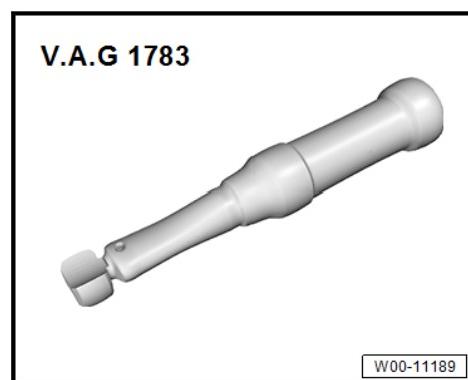


- ◆ Socket - 27mm -T40218-

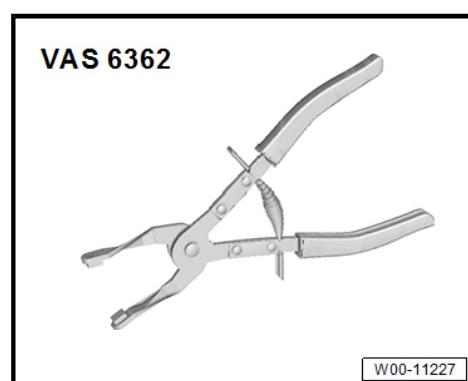




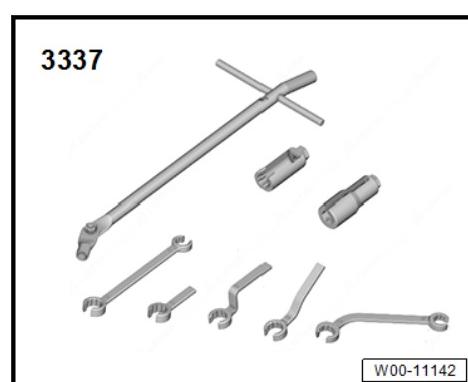
- ◆ Torque Wrench 1783 - 2-10Nm -VAG1783-



- ◆ Hose Clip Pliers -VAS6362-



- ◆ Ring Wrench 7-Piece Set -3337-



- ◆ Ultrasonic Cleaning Unit -VAS6418-
- ◆ Mounting Plate for Injection Modules -VAS6418/1-
- ◆ Cleaning fluid. Refer to the Parts Catalog.



26 – Exhaust System, Emission Controls

1 Exhaust Pipes/Mufflers

[⇒ -1.1 Muffler", page 367](#)

[⇒ M1.2 uffler, Removing and Installing", page 368](#)

[⇒ S1.3 ystem, Installing without Tension", page 369](#)

[⇒ S1.4 ystem, Checking for Leaks", page 370](#)

[⇒ S1.5 leeve Installation Position", page 371](#)

1.1 Overview - Muffler



1 - Exhaust Pipe with Rear Muffler

- Removing and installing. Refer to [M1.2 muffler, Removing and Installing](#), page 368 .
- Note the installation position

2 - Bolt

- 25 Nm
- Replace after removing

3 - Separating Point

- Center
- Identified on exhaust pipe by an impression
- Cut the exhaust pipe at a right angle at the separating point using the -VAG1523A- or -VAS6254-. Refer to [M1.2 muffler, Removing and Installing](#), page 368 .

4 - Mounting Strap

- Fuel tank to body

5 - Bolt

- Rear tensioning strap to body
- Refer to [Rep. Gr. 20; Fuel Tank; Overview - Fuel Tank](#).

6 - Bolt

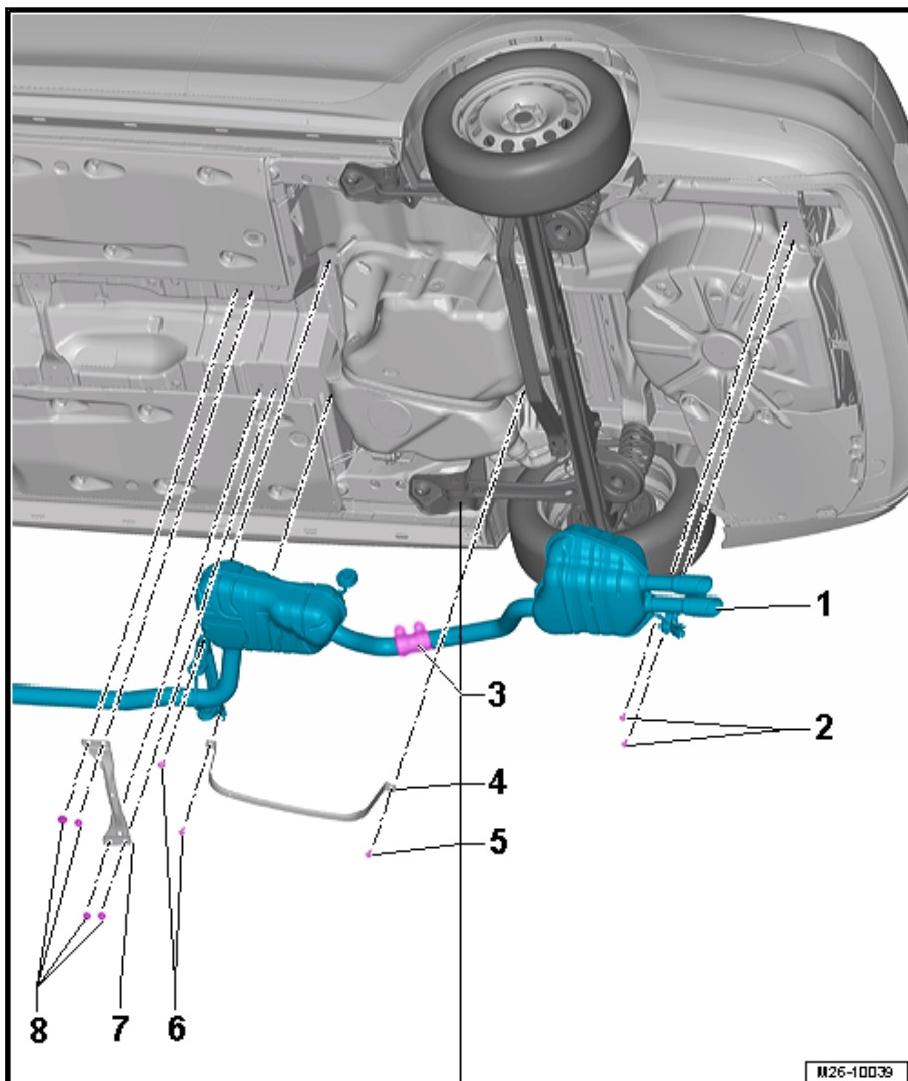
- Front tensioning strap to body
- Center muffler bracket to body
- Refer to [Rep. Gr. 20; Fuel Tank; Overview - Fuel Tank](#).

7 - Rear Tunnel Brace

- Removing and installing. Refer to [Body Exterior; Rep. Gr. 66; Underbody Trim Panel; Tunnel Bridge, Removing and Installing](#).

8 - Nut

- 20 Nm
- Rear Tunnel Brace



M26-10039

1.2 Rear Muffler, Removing and Installing

Special tools and workshop equipment required

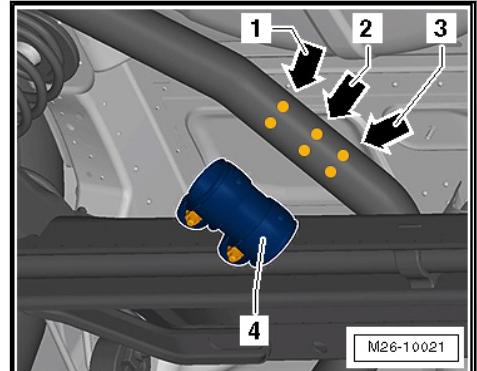
- ◆ Chain Pipe Cutter -VAS6254- or
- ◆ Pneumatic Body Saw -VAG1523B-
- ◆ A separating point has been provided in the connecting pipe for individual replacement of the center or rear muffler.



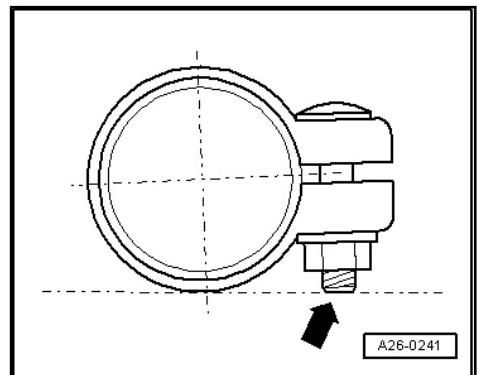
- ◆ The separating point is marked by an indentation around the circumference of the exhaust pipe.

Procedure

- Disconnect the exhaust pipe at the disconnecting point -arrow 2- with the -VAS6254- or -VAS6780-.



- Position the clamping sleeve -4- centrally at the edge markings -1 and 3- when installing.
- Install the clamping sleeve so that bolt end does not project beyond the lower edge of the clamping sleeve -arrow-.



- Align the rear muffler without tension. Refer to [S1.3 system, Installing without Tension](#), page 369 .
- Align the tail pipe so that the dimensions -a- are equal.

Clamping sleeve installation position and tightening specification. Refer to [S1.5 sleeve Installation Position](#), page 371 .

1.3 Exhaust System, Installing without Tension

Procedure

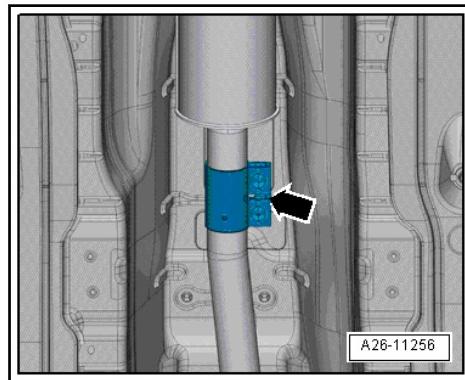
- Align the exhaust system when cold.



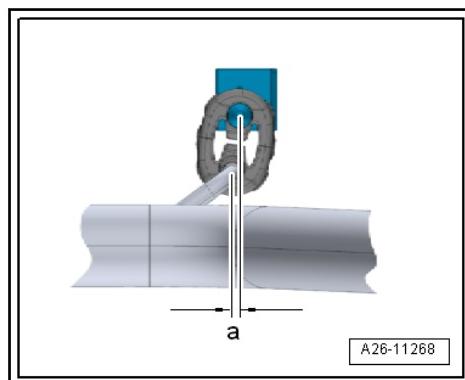
Note

The -arrow- points in the direction of travel.

- Loosen the screws for the front clamping sleeve -arrow-.

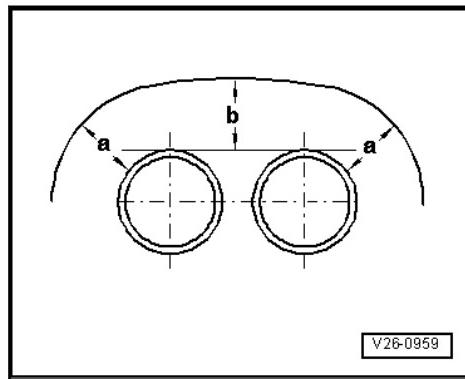


- Push the exhaust system far enough forward until the pre-load on the retaining loops at the exhaust pipe -a- = 5 mm.



Tail Pipes, Aligning

- Align the rear muffler so that the space -a and b- between the opening for the bumper and the tail pipes is the same.



- Loosen the rear muffler suspended mount to align the tail pipes.
- Install the clamping sleeve. Refer to [S1.5 Ieve Installation Position](#), page 371 .

Tightening Specifications

- ♦ Refer to [-1.1 Muffler](#), page 367

1.4 Exhaust System, Checking for Leaks

Procedure

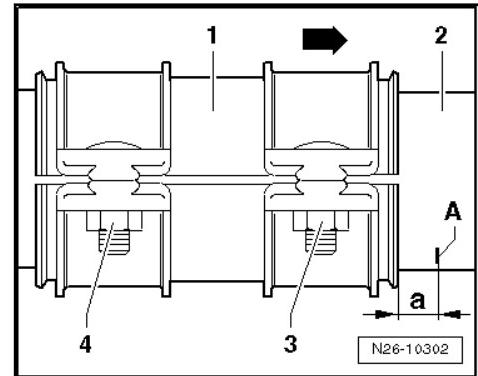
- Start the engine and let it run at idle.
- Seal the tail pipes with cloths or plugs during the leakage test.



- Check for leaks where the exhaust manifold attaches to the cylinder head and where the turbocharger attaches to the front exhaust pipe.
- Repair the detected leaks.

1.5 Clamping Sleeve Installation Position

Front Clamping Sleeve



- Installed dimension -a- is approximately 1 cm

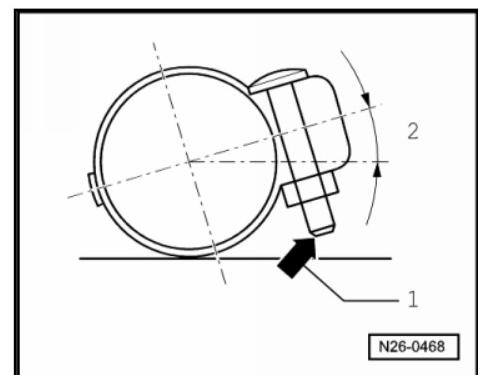
A - End of bead

1 - Clamping Sleeve

2 - Front Exhaust Pipe

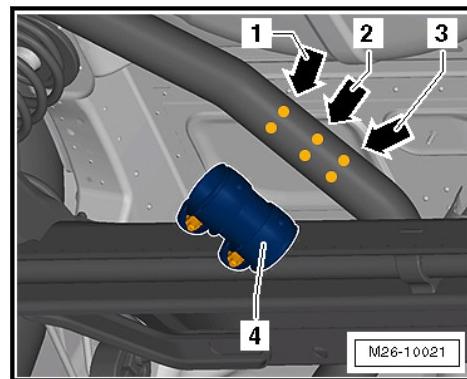
a - Installed Dimension

Installed Position of the Front Clamping Sleeve

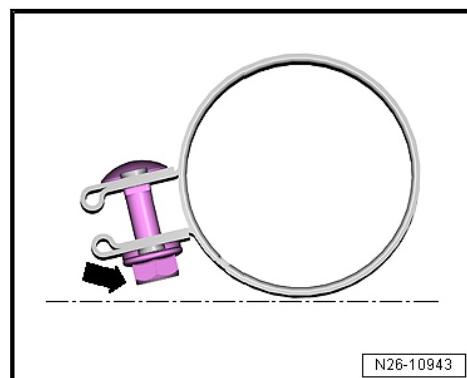


- Install the clamping sleeve so that the bolt end -arrow- does not project beyond the lower edge of clamping sleeve.
- Threaded connection points toward the right.

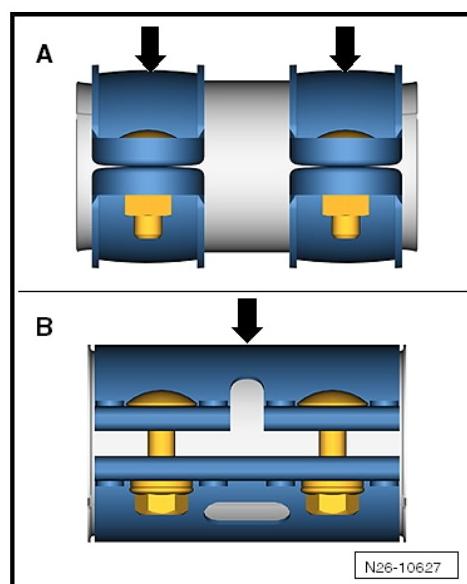
Rear Repair Clamping Sleeve Installation Position



- Disconnect the exhaust pipe at the disconnecting point -arrow 2- with the -VAS6254- or -VAS6780-.
- When installing, position the clamping sleeve -4- on side markings -arrows 1 and 3-.
- Install the clamping sleeve so that the bolt end does not project beyond the lower edge of the double clamp -arrow-.
- Align the exhaust system free of tension.



Clamping Sleeve Tightening Specification and Installed Dimension





Tightening Specifications

Clamping Sleeve	Tightening Specification
Clamping sleeve -A- with two individual clamps	25 Nm
Clamping sleeve -B- with continuous clamp.	35 Nm



2 Emissions Control

⇒ [-2.1 Emissions Control", page 374](#)

⇒ [C2.2 onverter, Removing and Installing", page 374](#)

2.1 Overview - Emissions Control

1 - Bracket

- For catalytic converter
- To subframe

2 - Catalytic Converter

- With front exhaust pipe
- Protect catalytic converter from shocks and impact stress
- Removing and installing. Refer to ⇒ [C2.2 onverter, Removing and Installing", page 374](#).

3 - V- Clamp

- Replace after removing
- Tightening specification. Refer to ⇒ [-1.1 Turbocharger", page 286](#).

4 - Seal

- Replace after removing

5 - Turbocharger

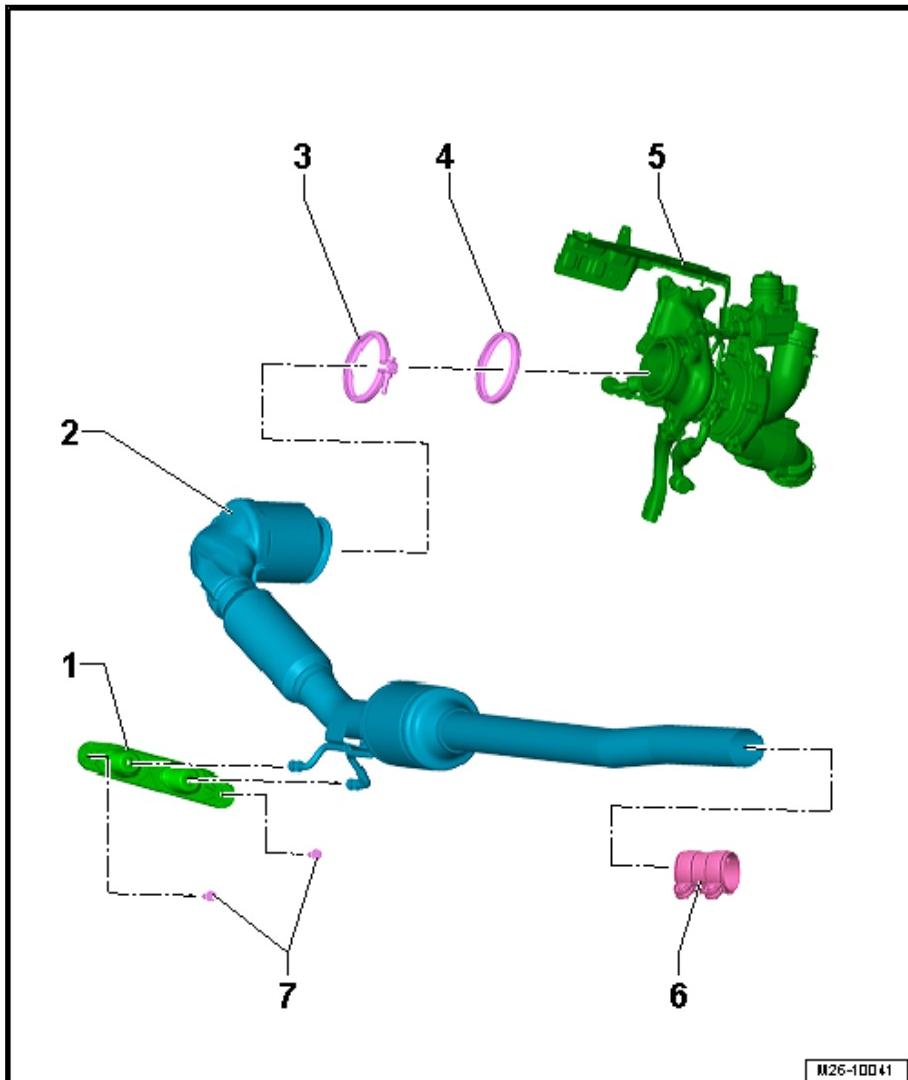
- Removing and installing. Refer to ⇒ [1 , page 286](#).

6 - Front Clamp

- Before tightening, align the exhaust system without tension. Refer to ⇒ [S1.3 ystem, Installing without Tension", page 369](#).
- Tighten threaded connections evenly.

7 - Bolt

- 23 Nm



M26-10041

2.2 Catalytic Converter, Removing and Installing

Special tools and workshop equipment required

- ◆ Hot bolt paste. Refer to the Parts Catalog.

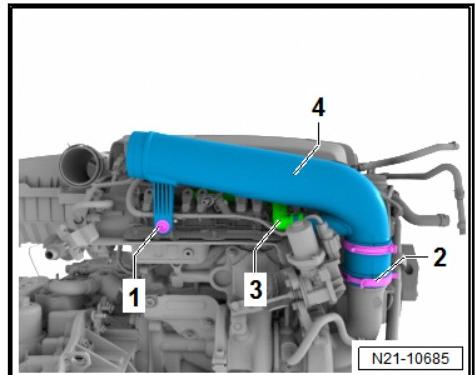


The catalytic converter is removed with the front exhaust pipe.

Removing

- Remove the engine cover. Refer to [⇒ C3.1 over, Removing and Installing](#), page 40 .
- Remove the connecting tube from the air filter housing to the charge air pipe. Refer to [⇒ F3.2 filter Housing, Removing and Installing](#), page 329 .

Item -3- with Two Different Versions

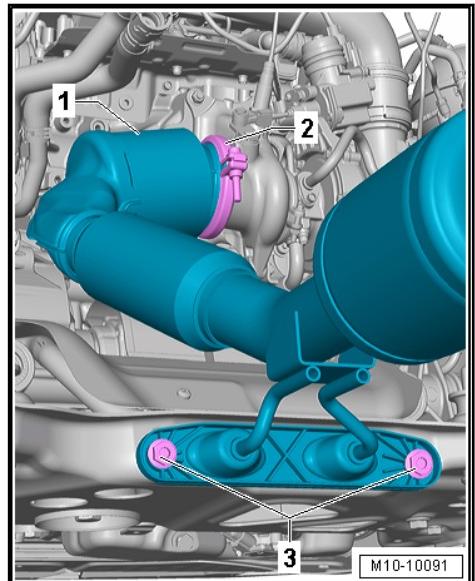


Item -3-, Version 1 with Two Locking Tabs

- Push the locking mechanism on the crankcase ventilation hose -3- together and remove the hose.

Item -3-, Version 2 without Locking Tabs

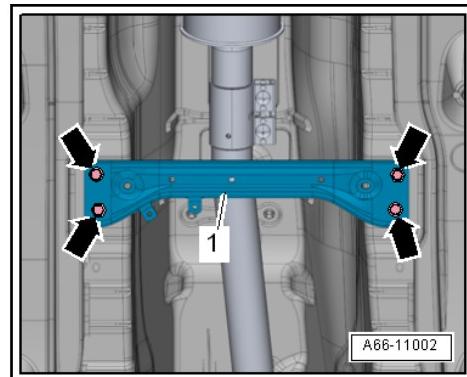
- Lay the air guide pipe with the connected line -3- on the cylinder head.
- Remove the noise insulation. Refer to [⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation](#).
- Remove the bolt -2- and the clamp.



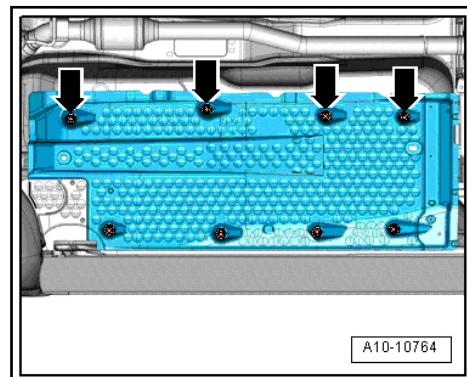
- Remove the nuts -3-.



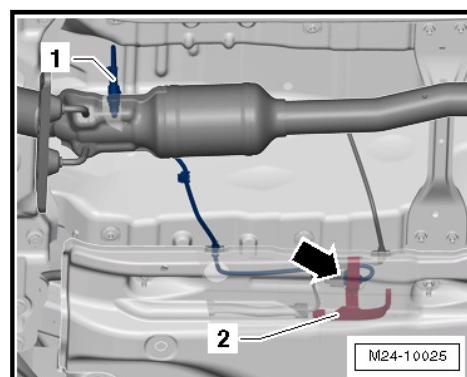
- Remove the front tunnel brace -1-. Refer to ⇒ Body Exterior; Rep. Gr. 66; Underbody Trim Panel; Tunnel Bridge, Removing and Installing.



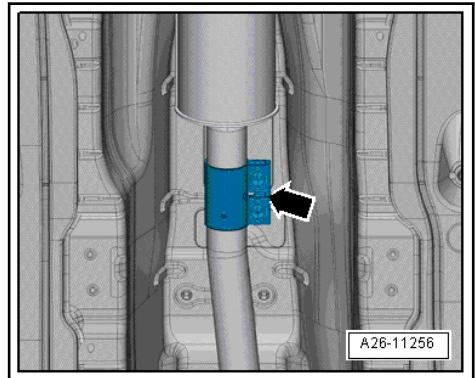
- Remove the nuts -arrows- from the right underbody panel and pull the underbody panel slightly downward.



- Unclip the connector -arrow- from the bracket -2- and disconnect it.



- Secure wire to the turbocharger to prevent damage.
- Loosen the clamping sleeve -arrow- and push it toward the rear.
- Remove the catalytic converter with the front exhaust pipe.



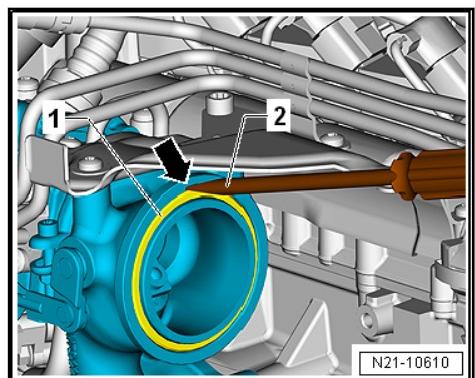
Installing

Install in reverse order of removal and note the following:



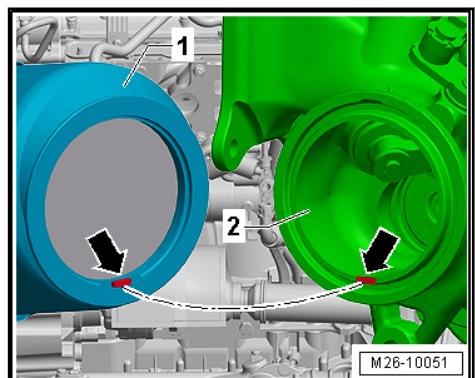
Note

- ◆ Replace the seal and self-locking nuts.
- ◆ Coat the exhaust manifold stud bolts with hot bolt paste.
Refer to the Parts Catalog for the hot bolt paste.
- Insert the screwdriver -2- into the opening -arrow- on the turbocharger.



- Pry out the seal -1-.
- Replace the seal -1-.

Observe the Installed Position of the Catalytic Converter -1- on the Turbocharger -2-.



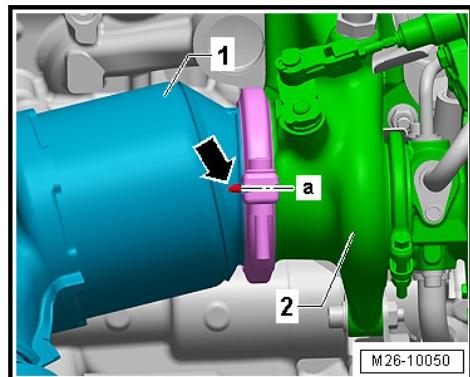
- The retaining strap and notch -arrows- must interlock.



- Attach the catalytic converter to the turbocharger and secure the new v - clamp loosely.
- Tighten the v-clamp.

Installed Position of the V-Clamp

- The opening of the v-clamp -a- must align with the marking -arrow- on the catalytic converter -1-.
- Install the exhaust system without tension. Refer to [S1.3 system, Installing without Tension”, page 369](#).



Tightening Specifications

- ◆ Refer to [-2.1 Emissions Control”, page 374](#)
- ◆ Refer to [Body Exterior; Rep. Gr. 66; Underbody Trim Panel; Underbody Panels, Removing and Installing.](#)
- ◆ Refer to [Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.](#)



3 Secondary Air System

[**⇒ -3.1 Secondary Air Injection System", page 379**](#)

[**⇒ S3.2 Secondary Air Injection Pump Motor V101, Removing and
Installing", page 381**](#)

[**⇒ S3.3 Secondary Air Injection Solenoid Valve N112, Removing
and Installing", page 381**](#)

3.1 Overview - Secondary Air Injection System



1 - Air Filter Housing

- Removing and installing. Refer to [F3.2 Air Filter Housing, Removing and Installing](#), page 329 .

2 - O-ring

- Replace after removing
- Coat with engine oil

3 - Connecting Line

- Pressure Line
- From the secondary air injection solenoid valve to the secondary air injection pump motor

4 - Bracket

- Connector

5 - Nut

- 8 Nm

6 - Bracket

- On body

7 - Bolt

- 9 Nm

8 - Seal

- Replace after removing secondary air injection valve

9 - Secondary Air Injection Solenoid Valve

- Removing and installing secondary air injection solenoid valve. Refer to [S3.3 Secondary Air Injection Solenoid Valve N112, Removing and Installing](#), page 381 .

10 - Nut

- 8 Nm

11 - Bracket

- Secondary air injection pump motor

12 - Rubber Bushing

13 - Secondary Air Injection Pump Motor

- Secondary air injection pump motor, removing and installing. Refer to [S3.2 Secondary Air Injection Pump Motor V101, Removing and Installing](#), page 381 .

14 - Connecting Line

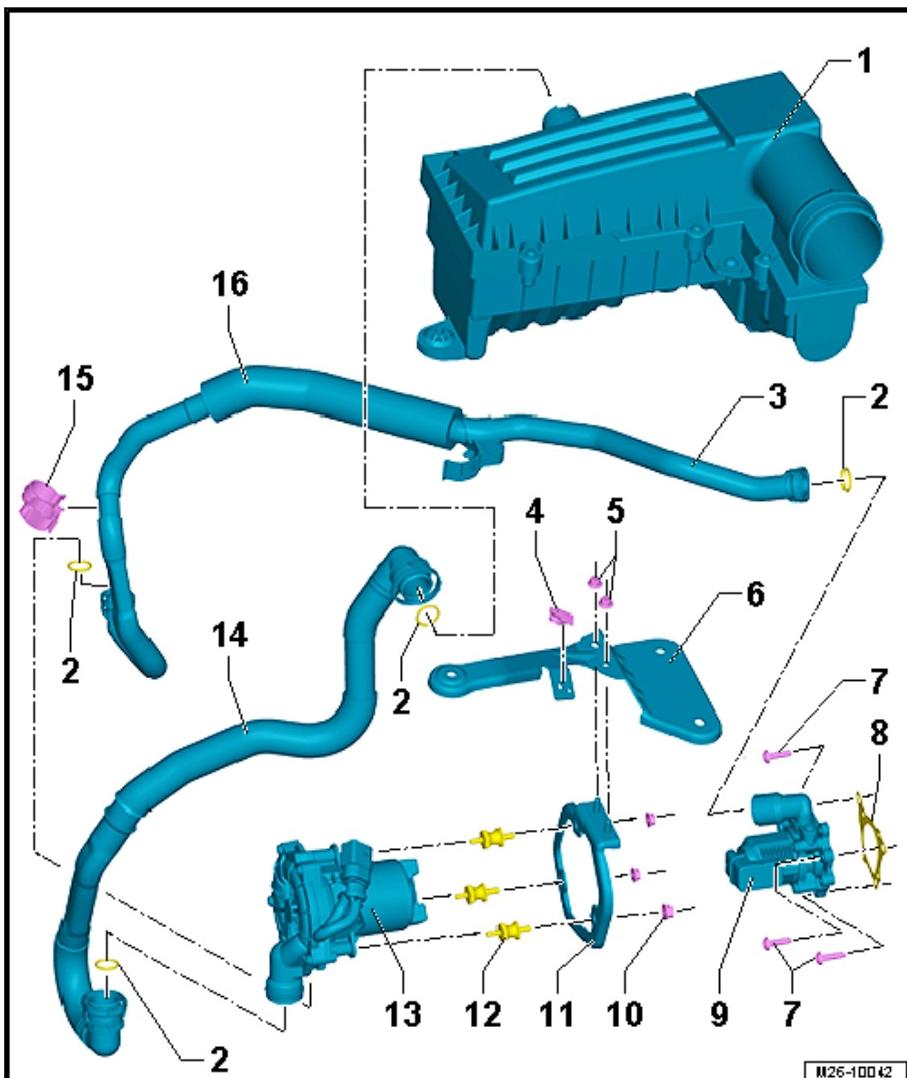
- Suction Line
- From the air filter housing to the secondary air injection pump motor

15 - Bracket

- Connecting Line

16 - Protection

- Connecting Line
- Check for proper seating



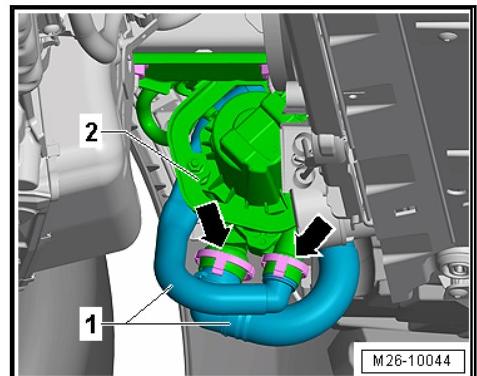
M26-10042



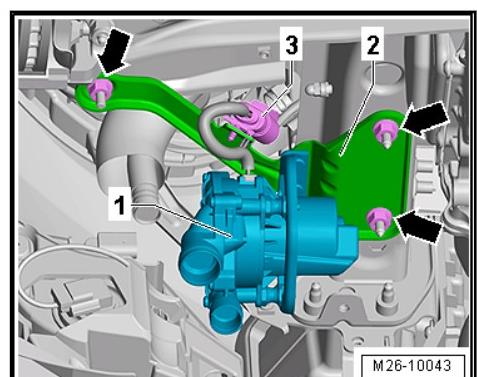
3.2 Secondary Air Injection Pump Motor - V101-, Removing and Installing

Removing

- Remove the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.
- Remove the left front wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66; Wheel Housing Liner; Front Wheel Housing Liner, Removing and Installing.
- Press the release -arrows- and remove the lines -1- from the Secondary Air Injection Pump Motor -V101- -2-.



- Disconnect the connector -3-.



- Remove the nuts -arrows- and the Secondary Air Injection Pump Motor -V101- -1- with the bracket -2-.
- Remove the -red- connecting pipes from the secondary air injection pump -1-. To do so, push the locking ring together on both sides.
- Remove both nuts -arrows- and remove the secondary air injection pump downward.

Installing

Install in reverse order of removal and note the following:

Tightening Specifications

- Refer to ⇒ [-3.1 Secondary Air Injection System](#), page 379

3.3 Secondary Air Injection Solenoid Valve -N112-, Removing and Installing

- The flange must not be separated from the secondary air injection solenoid valve.



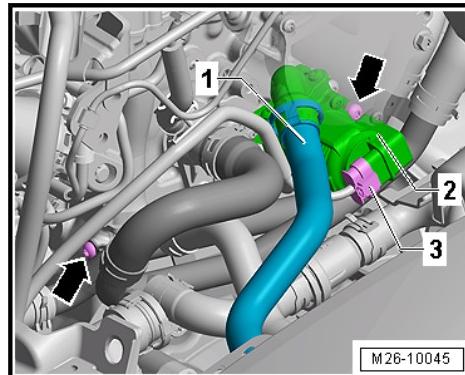
Jetta 2011 >, Jetta 2015 >

4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

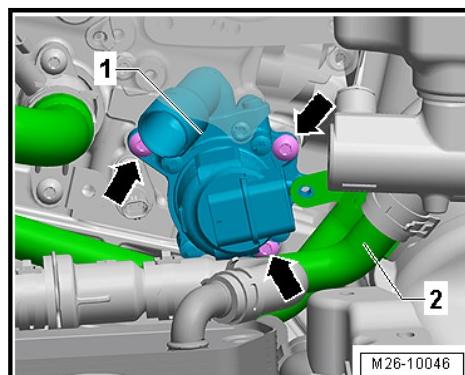
- Both the secondary air injection solenoid valve and the flange are replaced completely.

Removing

- Remove the air filter housing. Refer to [⇒ F3.2 Filter Housing, Removing and Installing](#), page 329 .
- Remove the battery tray. Refer to ⇒ Electrical Equipment; Rep. Gr. 27; Battery; Battery Tray, Removing and Installing.
- Disconnect the connector -3-.



- Squeeze the locking ring on both sides to remove the connecting pipe -1-.
- Remove the bolts -arrows-.
- Push the coolant pipe -2- gently aside.



- Remove the bolts -arrows- and the Secondary Air Injection Solenoid Valve -N112-.

Installing

Install in reverse order of removal and note the following:

- Replace the O-ring. Refer to the Parts Catalog.

Tightening Specifications

- Refer to [⇒ -3.1 Secondary Air Injection System](#), page 379

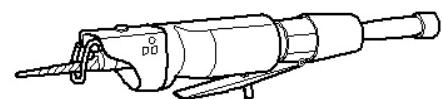


4 Special Tools

Special tools and workshop equipment required

- ◆ Pneumatic Body Saw -VAG1523B-

V.A.G 1523 B



W00-10931

- ◆ or

- ◆ Chain Pipe Cutter -VAS6254-

VAS 6254



W00-11552



28 – Ignition/Glow Plug System

1 Ignition System

- ⇒ [-1.1 Ignition System", page 384](#)
- ⇒ [D1.2 ata and Spark Plugs", page 385](#)
- ⇒ [C1.3 oils with Power Output Stages, Removing and Installing", page 386](#)
- ⇒ [K1.4 nock Sensor 1 G61, Removing and Installing", page 388](#)
- ⇒ [P1.5 osition Sensor, Removing and Installing", page 389](#)
- ⇒ [E1.6 ngine Speed Sensor G28, Removing and Installing", page 389](#)

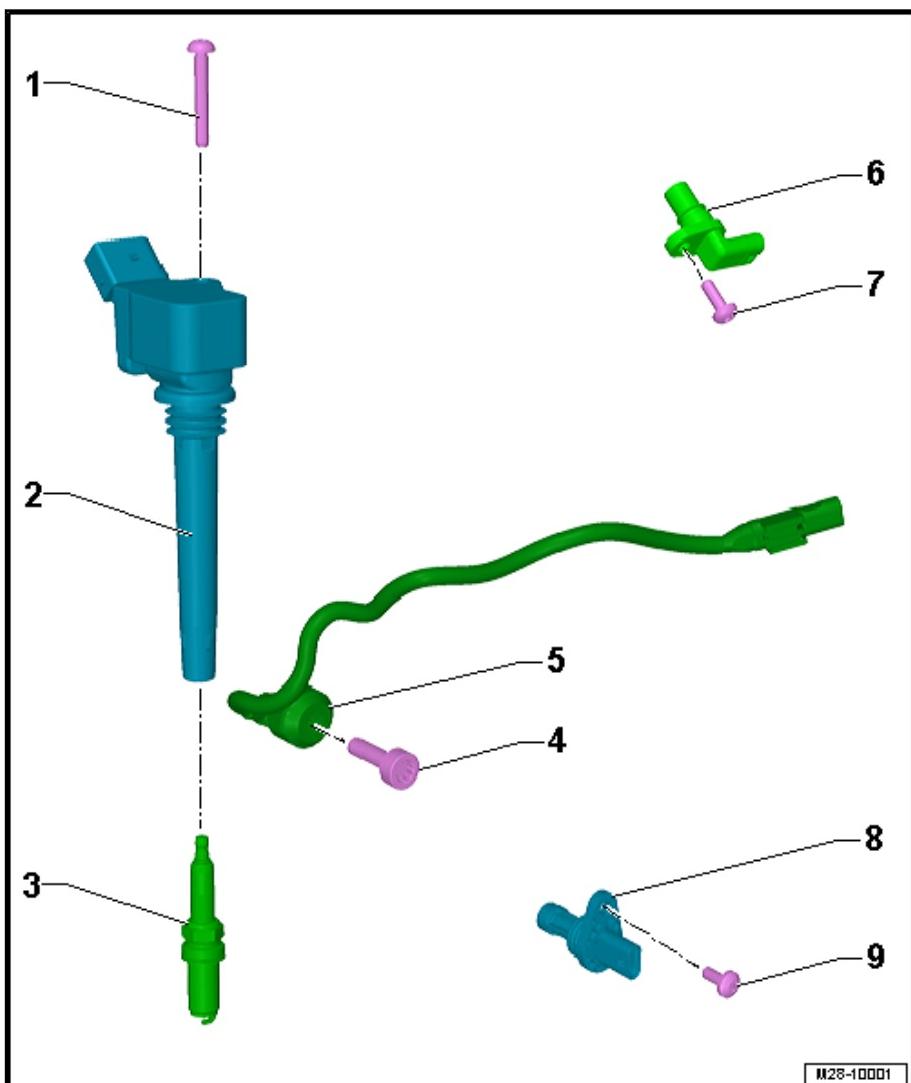
1.1 Overview - Ignition System

**1 - Bolt**

- 10 Nm

2 - Ignition Coil with Power Output Stage

- Ignition Coil 1 with Power Output Stage - N70-
- Ignition Coil 2 with Power Output Stage - N127-
- Ignition Coil 3 with Power Output Stage - N291-
- Ignition Coil 4 with Power Output Stage - N292-
- Removing and installing. Refer to [C1.3 coils with Power Output Stages, Removing and Installing](#), page 386 .

**3 - Spark Plug**

- 30 Nm
- Removing and installing. Refer to [Maintenance; Booklet 20.2](#).

4 - Bolt

- 8 Nm +90°
- Replace after removing
- The tightening specification affect how the knock sensor functions

5 - Knock Sensor 1 -G61-

- Contacts gold plated
- Removing and installing. Refer to [K1.4 knock Sensor 1 G61, Removing and Installing](#), page 388 .

6 - Camshaft Position Sensor -G40-

- Camshaft Position Sensor -G40-, Removing and installing. Refer to [P1.5 osition Sensor, Removing and Installing](#), page 389 .
- Replace the O-ring

7 - Bolt

- 9 Nm

8 - Engine Speed Sensor -G28-

- Check the O-ring for damage
- Removing and installing. Refer to [E1.6 ngine Speed Sensor G28, Removing and Installing](#), page 389 .

9 - Bolt

- 10 Nm

1.2 Test Data and Spark Plugs

Ignition sequence	1-3-4-2
Spark plugs	



Jetta 2011 >, Jetta 2015 >

4-Cylinder Fuel Injection Engine (1.8L; 2.0L TFSI Engine, EA 888 Generation III) - Edition 05.2021

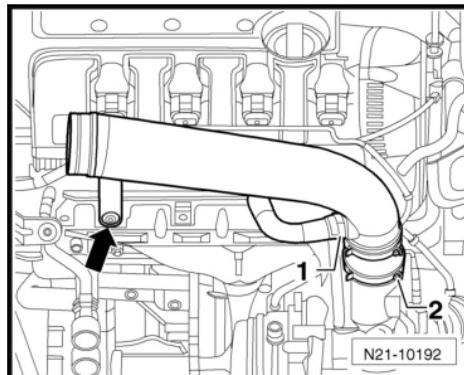
VW part number. Refer to ¹⁾ .	06K 905 601 B	06K 905 611 C
Electrode gap	0.7 to 0.8 mm	0.7 to 0.8 mm
Tightening Specification	-Item 3- ⇒ Item 3 (page 385)	
Change intervals	Change intervals. Refer to the ⇒ Maintenance Intervals; Rep. Gr. 03.	

1) Refer to the Parts Catalog for the current spark plugs.

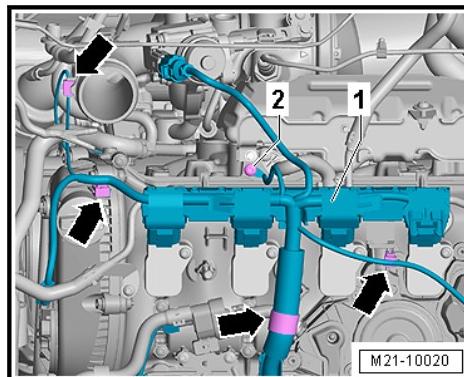
1.3 Ignition Coils with Power Output Stages, Removing and Installing

Removing

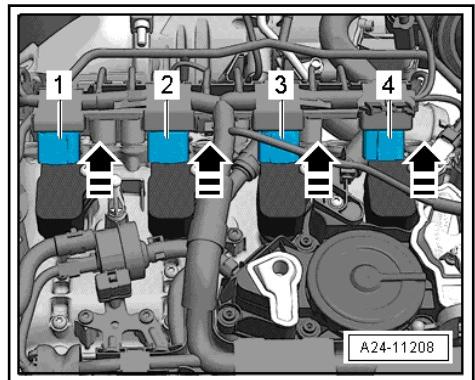
- Remove the engine cover. Refer to [C3.1 over, Removing and Installing](#), page 40 .
- Remove the air filter housing connecting tube from the charge air pipe. Refer to [F3.2 filter Housing, Removing and Installing](#), page 329 .
- Remove the air duct pipe bolt -arrow-.



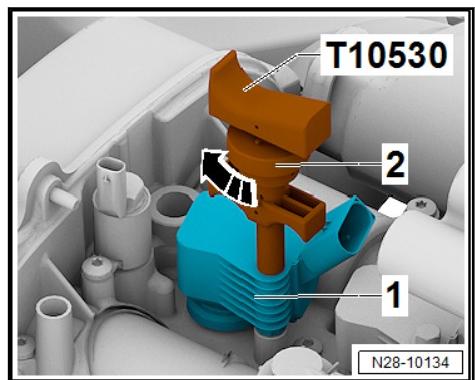
- Push the air duct pipe gently backwards to remove the connector from the ignition coils.
- Remove bolt -2- and unclip the electrical wiring harness -1- from the retainers -arrows-.



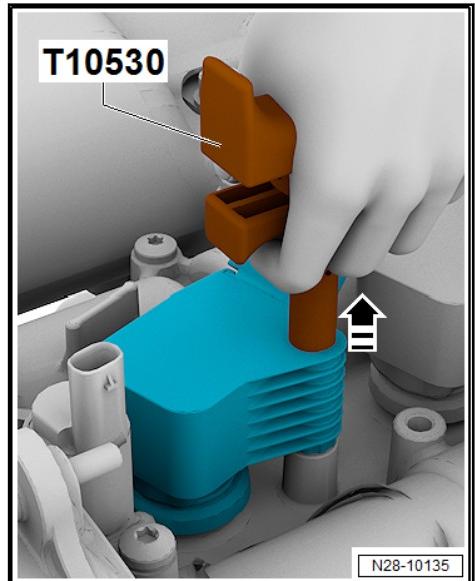
- Release the connector and disconnect all the connectors at the same time from the ignition coils.



- Remove the bolts for the ignition coil that is being removed.
- Insert the -T10530- in the ignition coil opening -1-.
- Turn the knurled nut -2- clockwise until the puller is clamped.



- Carefully remove the ignition coil vertically upward using the -T10530-.



Installing

- Push the ignition coils evenly onto the spark plugs using your hands (do not use any impact tools).
- Secure the ignition coil.

Tightening Specifications

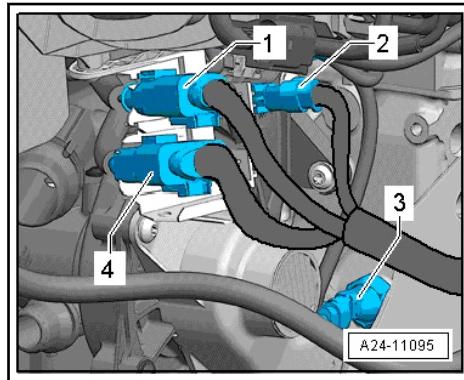
- ◆ Refer to [-1.1 Ignition System](#), page 384



1.4 Knock Sensor 1 -G61-, Removing and Installing

Removing

- Disconnect the connector -2- from Knock Sensor 1 -G61-.

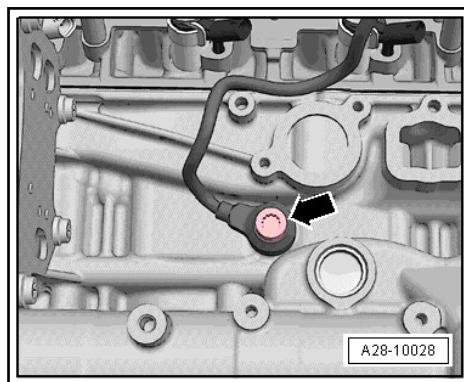


- Remove the coolant pump with thermostat. Refer to [T2.7 hermostat Housing, Removing and Installing](#), page [258](#).



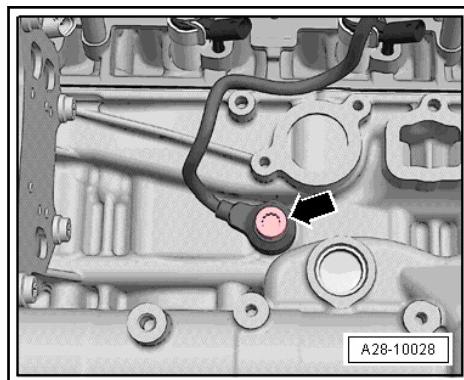
The Knock Sensor 1 -G61- is located below the intake manifold behind the coolant pump.

- Remove the Knock Sensor 1 -G61- -arrow-.



Installing

- Install in reverse order of removal.
- Note the installed position of the Knock Sensor 1 -G61-.





- Install the coolant pump with thermostat. Refer to [T2.7 Thermostat Housing, Removing and Installing](#), page 258 .

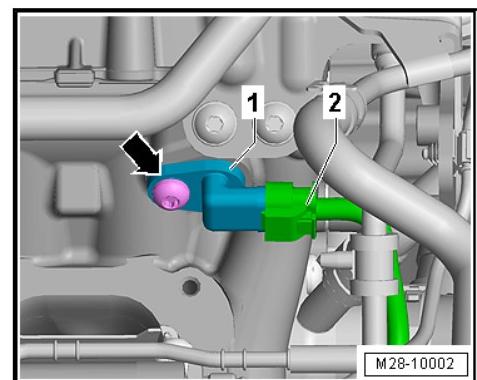
Tightening Specifications

- ◆ Refer to [-1.1 Ignition System](#), page 384

1.5 Camshaft Position Sensor, Removing and Installing

Removing

- Remove the engine cover. Refer to [C3.1 over, Removing and Installing](#), page 40 .
- Remove the intake manifold. Refer to [M4.2 Anifold, Removing and Installing](#), page 333 .
- Disconnect the connector -2-.



- Remove the bolt -arrow- and camshaft position sensor -1-.

Installing

Install in reverse order of removal and note the following:

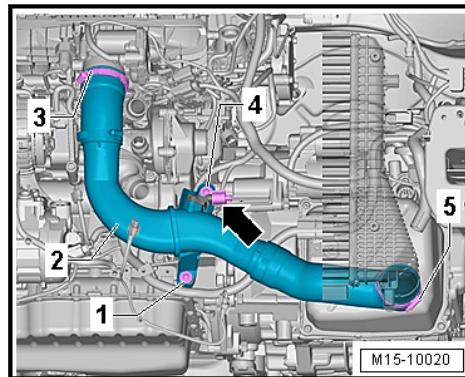
- Replace the O-ring.

Tightening Specifications

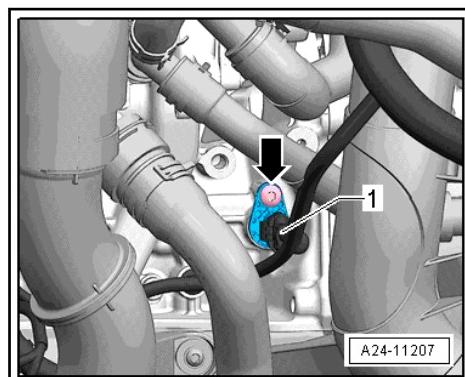
- ◆ Refer to [-1.1 Ignition System](#), page 384

1.6 Engine Speed Sensor -G28-, Removing and Installing

- Remove the noise insulation. Refer to [Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation](#).
- Loosen the hose clamp -3 and 5-.
- Disconnect the connector from the Charge Air Pressure Sensor -G31- -arrow-.
- Remove the bolts -1 and 4- and then remove the air duct pipe downward.



- Disconnect the connector -1- on the Engine Speed Sensor -G28-.
- Remove the bolt -arrow-.



Installing

Install in reverse order of removal.

- Install the air duct hose.
- Install the noise insulation. Refer to => Body Exterior; Rep. Gr. 66; Noise Insulation; Overview - Noise Insulation.

Tightening Specifications

- ◆ Refer to => [-1.1 Ignition System", page 384](#)

Local	15198
Feed-	61
back	
Local	14247
Feed-	67
back	
Facto-	
ry Up-	
date	

Cautions & Warnings

Please read these WARNINGS and CAUTIONS before proceeding with maintenance and repair work. You must answer that you have read and you understand these WARNINGS and CAUTIONS before you will be allowed to view this information.

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described in this manual, we suggest you leave such repairs to an authorized Volkswagen retailer or other qualified shop. We especially urge you to consult an authorized Volkswagen retailer before beginning repairs on any vehicle that may still be covered wholly or in part by any of the extensive warranties issued by Volkswagen.
- Disconnect the battery negative terminal (ground strap) whenever you work on the fuel system or the electrical system. Do not smoke or work near heaters or other fire hazards. Keep an approved fire extinguisher handy.
- Volkswagen is constantly improving its vehicles and sometimes these changes, both in parts and specifications, are made applicable to earlier models. Therefore, part numbers listed in this manual are for reference only. Always check with your authorized Volkswagen retailer parts department for the latest information.
- Any time the battery has been disconnected on an automatic transmission vehicle, it will be necessary to reestablish Transmission Control Module (TCM) basic settings using the Volkswagen Factory Approved Scan Tool (ST).
- Never work under a lifted vehicle unless it is solidly supported on stands designed for the purpose. Do not support a vehicle on cinder blocks, hollow tiles or other props that may crumble under continuous load. Never work under a vehicle that is supported solely by a jack. Never work under the vehicle while the engine is running.
- For vehicles equipped with an anti-theft radio, be sure of the correct radio activation code before disconnecting the battery or removing the radio. If the wrong code is entered when the power is restored, the radio may lock up and become inoperable, even if the correct code is used in a later attempt.
- If you are going to work under a vehicle on the ground, make sure that the ground is level. Block the wheels to keep the vehicle from rolling. Disconnect the battery negative terminal (ground strap) to prevent others from starting the vehicle while you are under it.
- Do not attempt to work on your vehicle if you do not feel well. You increase the danger of injury to yourself and others if you are tired, upset or have taken medicine or any other substances that may impair you or keep you from being fully alert.
- Never run the engine unless the work area is well ventilated. Carbon monoxide (CO) kills.
- Always observe good workshop practices. Wear goggles when you operate machine tools or work with acid. Wear goggles, gloves and other protective clothing whenever the job requires working with harmful substances.
- Tie long hair behind your head. Do not wear a necktie, a scarf, loose clothing, or a necklace when you work near machine tools or running engines. If your hair, clothing, or jewelry were to get caught in the machinery, severe injury could result.
- Do not re-use any fasteners that are worn or deformed in normal use. Some fasteners are designed to be used only once and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual - replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.

Cautions & Warnings

- Illuminate the work area adequately but safely. Use a portable safety light for working inside or under the vehicle. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.
- Friction materials such as brake pads and clutch discs may contain asbestos fibers. Do not create dust by grinding, sanding, or by cleaning with compressed air. Avoid breathing asbestos fibers and asbestos dust. Breathing asbestos can cause serious diseases such as asbestosis or cancer, and may result in death.
- Finger rings should be removed so that they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.
- Before starting a job, make certain that you have all the necessary tools and parts on hand. Read all the instructions thoroughly; do not attempt shortcuts. Use tools that are appropriate to the work and use only replacement parts meeting Volkswagen specifications. Makeshift tools, parts and procedures will not make good repairs.
- Catch draining fuel, oil or brake fluid in suitable containers. Do not use empty food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store the oily rags, which can ignite and burn spontaneously.
- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque listed.
- Keep sparks, lighted matches, and open flame away from the top of the battery. If escaping hydrogen gas is ignited, it will ignite gas trapped in the cells and cause the battery to explode.
- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.
- The air-conditioning (A/C) system is filled with a chemical refrigerant that is hazardous. The A/C system should be serviced only by trained automotive service technicians using approved refrigerant recovery/recycling equipment, trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.
- Before doing any electrical welding on vehicles equipped with anti-lock brakes (ABS), disconnect the battery negative terminal (ground strap) and the ABS control module connector.
- Do not expose any part of the A/C system to high temperatures such as open flame. Excessive heat will increase system pressure and may cause the system to burst.
- When boost-charging the battery, first remove the fuses for the Engine Control Module (ECM), the Transmission Control Module (TCM), the ABS control module, and the trip computer. In cases where one or more of these components is not separately fused, disconnect the control module connector(s).
- Some of the vehicles covered by this manual are equipped with a supplemental restraint system (SRS), that automatically deploys an airbag in the event of a frontal impact. The airbag is operated by an explosive device. Handled improperly or without adequate safeguards, it can be accidentally activated and cause serious personal injury. To guard against personal injury or airbag system failure, only trained Volkswagen Service technicians should test, disassemble or service the airbag system.

Cautions & Warnings

- Do not quick-charge the battery (for boost starting) for longer than one minute, and do not exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute before boosting the battery a second time.
- Never use a test light to conduct electrical tests of the airbag system. The system must only be tested by trained Volkswagen Service technicians using the Volkswagen Factory Approved Scan Tool (ST) or an approved equivalent. The airbag unit must never be electrically tested while it is not installed in the vehicle.
- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times before breaking the bead from the rim. Completely remove the tire from the rim before attempting any repair.
- When driving or riding in an airbag-equipped vehicle, never hold test equipment in your hands or lap while the vehicle is in motion. Objects between you and the airbag can increase the risk of injury in an accident.

I have read and I understand these Cautions and Warnings.